IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

This PHOTOFACT Folder Set is

WIRE-SEALED FOR YOUR PROTECTION

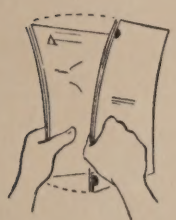
to guarantee completeness of contents

DO NOT ACCEPT IF SEAL HAS BEEN BROKEN

TO OPEN ***JUST DO THIS:***

1

Take hold of the Set with both hands. Place your thumbs directly under the top wire-seal; then, divide the contents equally by putting your thumbs midway through the thickness of the Set. Now, pull the two sections apart at the top, firmly.



2

Repeat this process, pulling close to the wire-seal at the bottom, so that the set is now divided into two equal parts.

3

Continue this "pulling-apart" process with the section in which the wire-seals remain, dividing it in half.

4

Finally, remove the wire-seals left in the last section; this can easily be done with your fingernail or any sharp instrument.

Your "Safety-Sealed" PHOTOFACT Set is now ready for profit-making use . . .

IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

The PHOTOFACT® Servicer

SET 477 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ MARCH 1960

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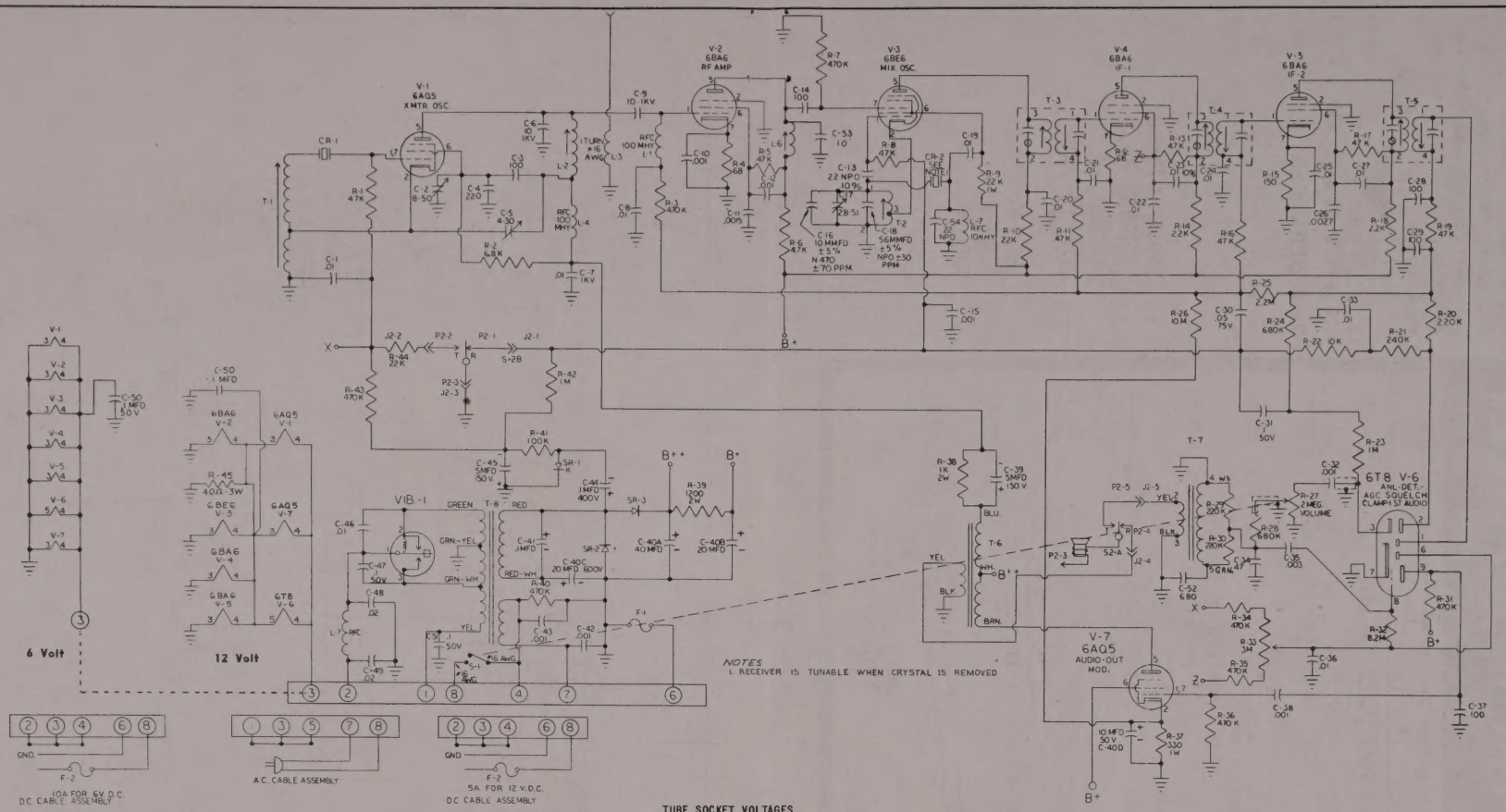
This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

IN THIS ISSUE OF THE SERVICER:

Motorola Models
5C24CW, PW,
5C25GW, NW
(CH. HS-580)

RCA Model
CRM-P2BM-5
(Radiomarine)



TUBE SOCKET VOLTAGES

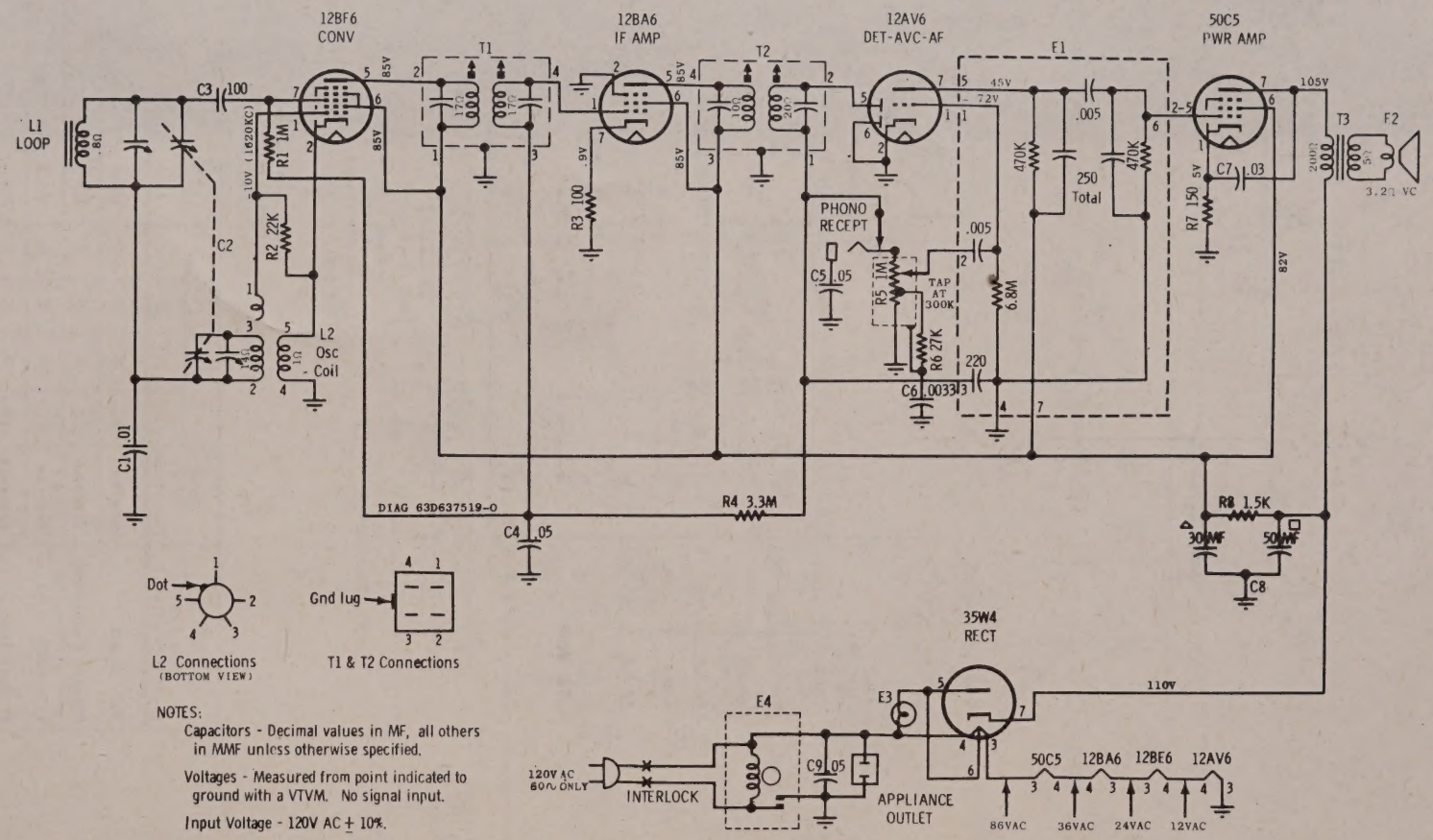
All voltages are measured to chassis with a VTVM and are positive except where noted. Transmitter tuned and loaded. No signal input to receiver. VOLUME and SQUELCH CONTROL fully clockwise.

Symbol, Tube Type, and Function	Type of Operation	Pin Numbers 1	2	3	4	5	6	7	8	9
V1 - 6AQ5A	Receive	-85	0	H	H	250	250	-85		
Crystal Oscillator	Transmit	-32	0	H	H	210	190	-25		
V2 - 6BA6	Receive	-0.5	0	H	H	170	60	0.6		
RF Amplifier	Transmit	-75	0	H	H	210	155	0.3		
V3 - 6BE6	Receive	-4	0	H	H	200	80	-3		
Mixer-Oscillator	Transmit	-85	0	H	H	230	230	0		

V4 - 6BA6	Receive	-3	0	H	H	185	65	0.6		
1st I.F. Amplifier	Transmit	-90	0	H	H	230	200	0		
V4 - 6BA6	Receiver	-0.3	0	H	H	190	80	1.3		
2nd I.F. Amplifier	Transmit	-90	0	H	H	230	230	0		
V6 - 6T8	Receive	-6	-1	0	H	H	-0.3	0	-1.2	60
Noise Lim. Det. Squelch	Transmit	-90	-90	-90	H	H	-0.1	0	-1.2	65
V7 - 6AQ5A	Receive	0	11	H	H	230	200	0		
Audio Output Modulator	Transmit	0	12	H	H	230	200	0		

RCA MODEL CRM-P2B-5 (RADIOMARINE)

Schematic Diagram Courtesy of Radio Corporation of America



NOTES:

Capacitors - Decimal values in MF, all others in MMF unless otherwise specified.

Voltages - Measured from point indicated to ground with a VTVM. No signal input.

Input Voltage - 120V AC ± 10%.

Tuning Range - 535 to 1620 KC.
IF - 455 KC.

MOTOROLA MODELS 5C24CW, PW, 5C25GW, NW (CH. HS-580)

Schematic Diagram Courtesy of Motorola Inc.

PHOTOFACT® Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

HOFFMAN
CHASSIS 348, 350

HOFFMAN
CHASSIS 348, 350

MODEL B3683 (Ch. 350)

HOFFMAN
CHASSIS 348, 350

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

DATE 3–60 SET 477 FOLDER 1

SET 477 FOLDER 1

PHOTOFACT® Folder with CIRCUITRACE®

HOFFMAN CHASSIS 348, 350

HOFFMAN CHASSIS 348, 350

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 10 wood screws holding rear cover. Remove the tuner antenna leads. Remove rear cover.
2. Remove Channel Selector knob. Remove top part of Control escutcheon by pulling straight out on both sides of Fine Tuning knob. Remove all push-on type knobs from front of cabinet. Remove 1 metal screw holding lower Control Escutcheon. Remove escutcheon.
3. Remove 4 wood screws holding front control bracket.
4. Remove speaker leads, HV lead, picture tube socket and yoke plug.
5. Remove 2 screws holding sound input-output bracket and 2 screws holding AC interlock.
6. Remove 2 wood screws holding chassis mounting brackets at top of cabinet. Remove 2 chassis bolts from bottom of chassis.
7. Remove chassis.

PICTURE TUBE REMOVAL

1. Remove chassis.
2. Remove 4 spring clips from rear, holding front escutcheon. Remove escutcheon.
3. Remove 4 picture tube mounting bracket bolts.
4. Remove picture tube.

MODEL B3683 (Ch. 350)

TRADE NAME	Hoffman	MODELS	CHASSIS
		B3653, B3663, M3653, M3663, SP3653, SP3663, W3653, W3663	348
		B3673, B3683, M3673, M3683, SP3673, SP3683, W3673, W3683	350
MANUFACTURER	Hoffman Electronics Corporation, Consumer Products Div., 6200 S. Avalon Blvd., Los Angeles 3, Calif.		
TYPE SET	Television Receiver		
TUBES	Eighteen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 210 Watts, 1.9 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

The safety glass is an integral part of the picture tube.

FUSE DEVICE

A Circuit Breaker is used for low voltage power supply protection, and may be reset by depressing the reset button. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENTS

To touch-up the VHF Oscillator, remove Channel Selector, Fine Tuning knobs, and Control Escutcheon.

AGC

The AGC may be varied by means of an AGC control. (For location, see "Tube Placement Chart".)

FOCUS

The focus may be varied by means of a Focus control. (For location, see "Tube Placement Chart".)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Frequency slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

HORIZONTAL DRIVE

The horizontal drive may be varied by a Horizontal Drive control. (For location, see "Tube Placement Chart".)

BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Ratio Detector secondary (A9) located on top of chassis.

CENTERING

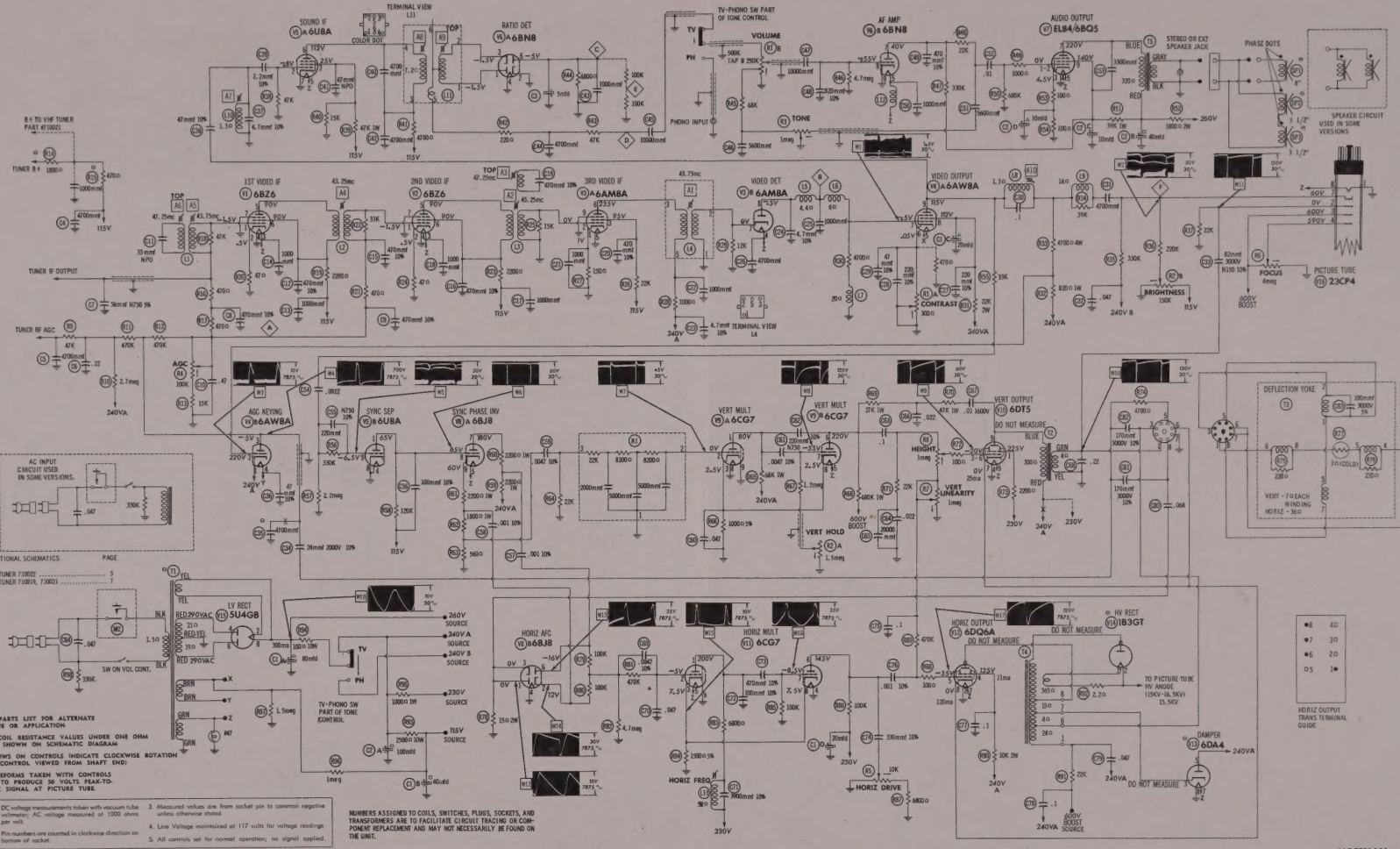
Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JA755

SET 477 FOLDER 1



● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation; no signal applied.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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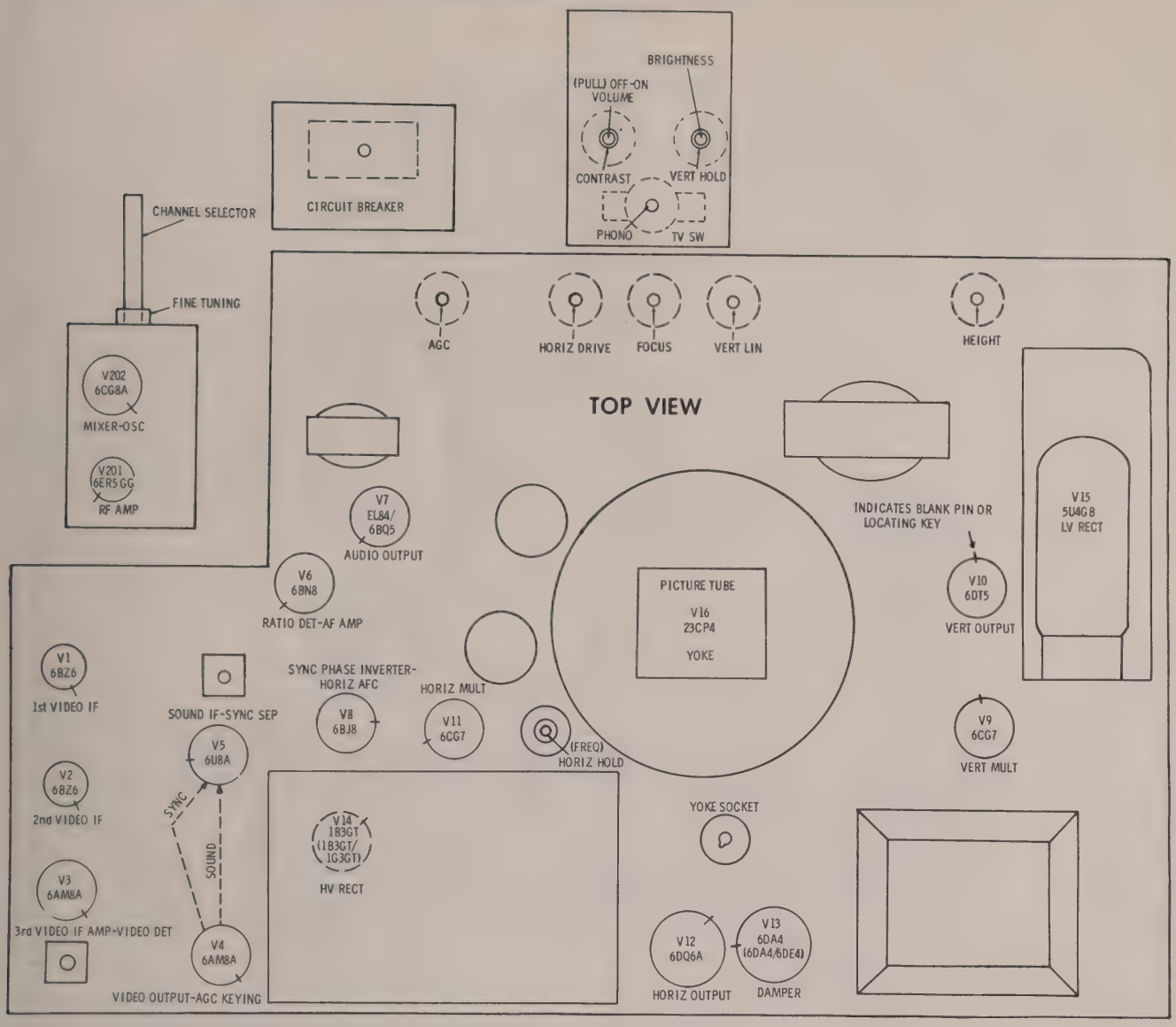
HOFFMAN
CHASSIS 348, 350

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound Circuit Breaker, V15

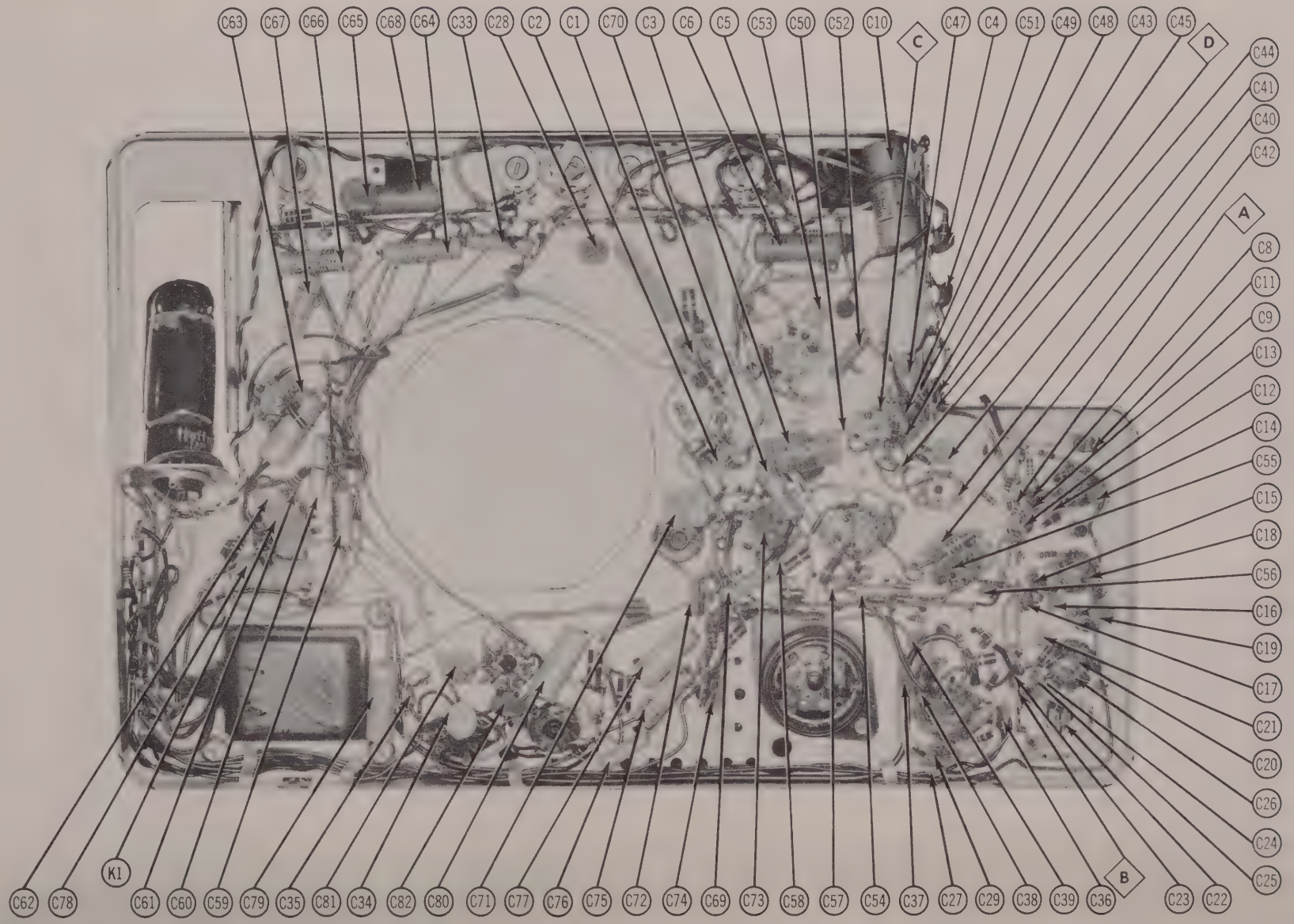
SWEEP FAILURE
No raster, has sound V11, V12, V13, V14, V16
No vertical deflection V9, V10
Poor vert. linearity or foldover V9, V10
Poor horiz. linearity or foldover V11, V12, V13
Narrow picture V11, V12, V13, V15
Vert. off freq. V9
Horiz. off freq. V8, V11

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V16
Has pic, no sound V5, V6, V7
Overloaded picture V4

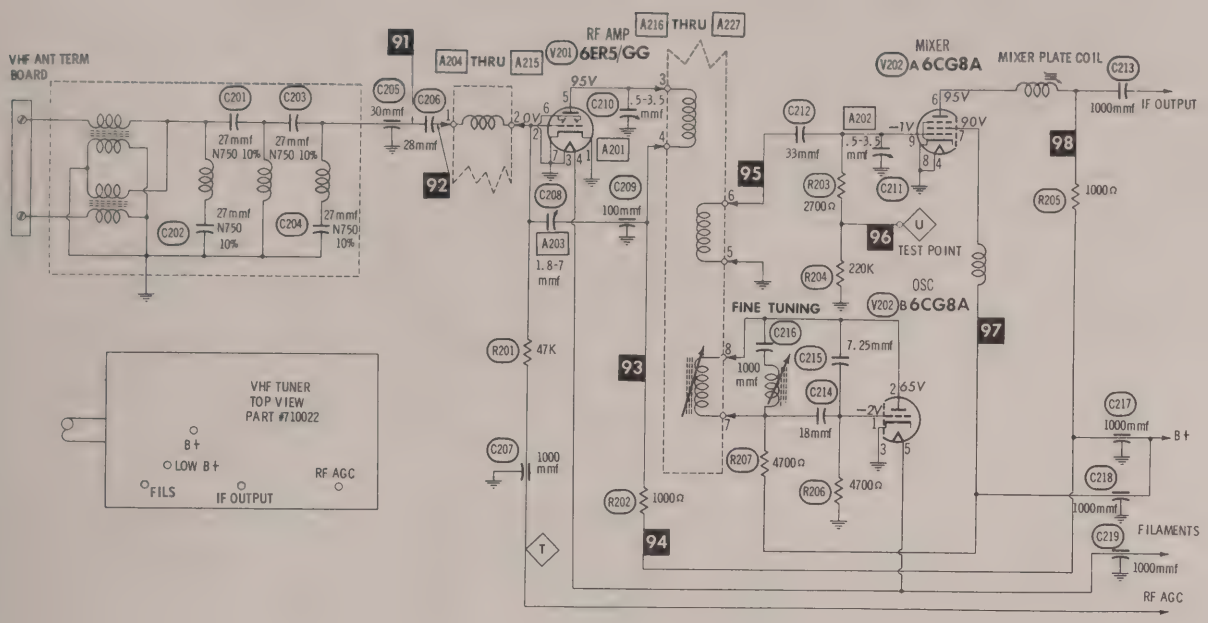
SYNC FAILURE
No vert. sync V5, V8
No horiz. sync V5, V8
No vert. or horiz. sync V5, V8

HOFFMAN
CHASSIS 348, 350

FOLDER 1



CHASSIS BOTTOM VIEW - CAPACITOR & MISC. IDENT.



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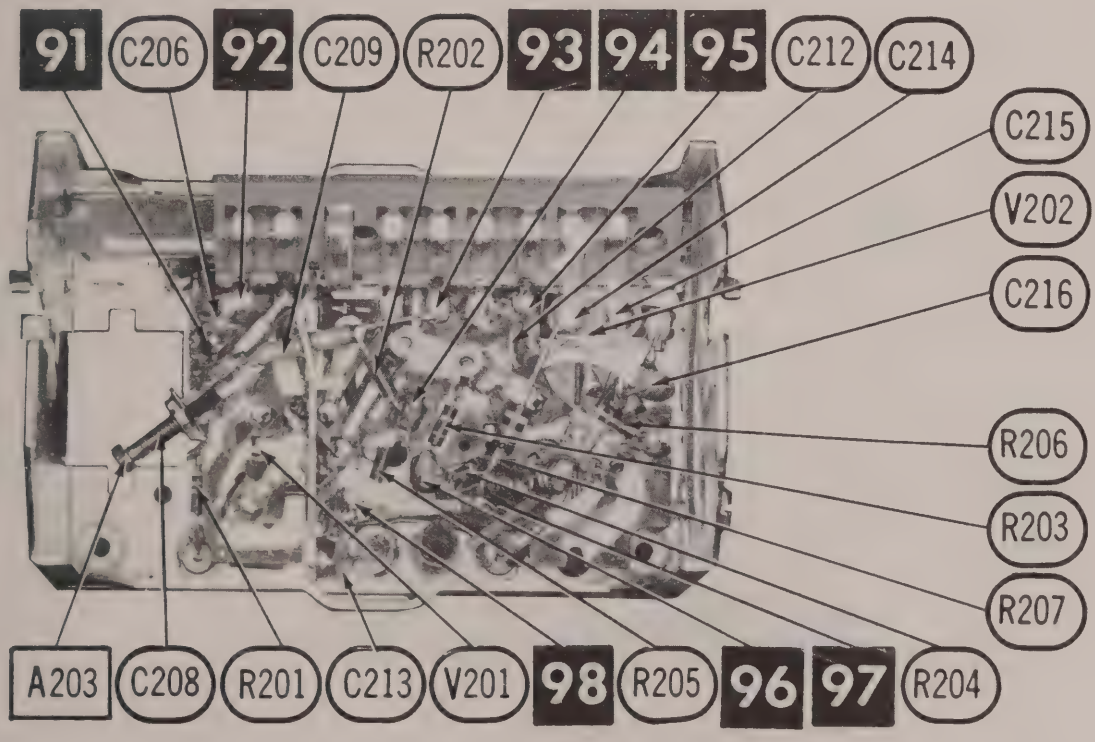
VHF TUNER 710022



A Howard W. Sams CIRCUITRACE® Photo

TUNER 710022 - BOTTOM VIEW

HOFFMAN CHASSIS 348, 350

FOLDER 1

TUNER PARTS LIST AND DESCRIPTIONS

710022

TUBES

◆ CBS ◆		GENERAL ELECTRIC ◆		RAYTHEON ◆		SYLVANIA ◆	
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE		
V201	RF Amp.	6ER5/GG	V201	Mixer-Osc.	6CG8A		

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	27 N750 10%		N750-DI 25	TCN-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C202	27 N750 10%		N750-DI 25	TCN-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C203	27 N750 10%		N750-DI 25	TCN-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C204	27 N750 10%		N750-DI 25	TCN-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C205	30							
C206	28		NPO-DI 25	TCN-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C207	1000		EF-001	MFT-1000		CCF-102	CT280A	
C208	1.8-7			829-7				
C209	100			MFT-100				
C210	.5-3.5							
C211	.5-3.5							
C212	33		NPO-DI 33	DTZ-33	C10Q33C	CCTO-330	CNO-433	10TCC-Q33
C213	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C214	18		NPO-DI 20	TCZ-18	C10Q18C	CCTO-180	CNO-418	10TCC-Q18
C215	7.25				C10V7C			10TS-V75
C216	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C217	1000		EF-001	MFT-1000		CCF-102	CT280A	
C218	1000		EF-001	MFT-1000		CCF-102	CT280A	
C219	1000		EF-001	MFT-1000		CCF-102	CT280A	

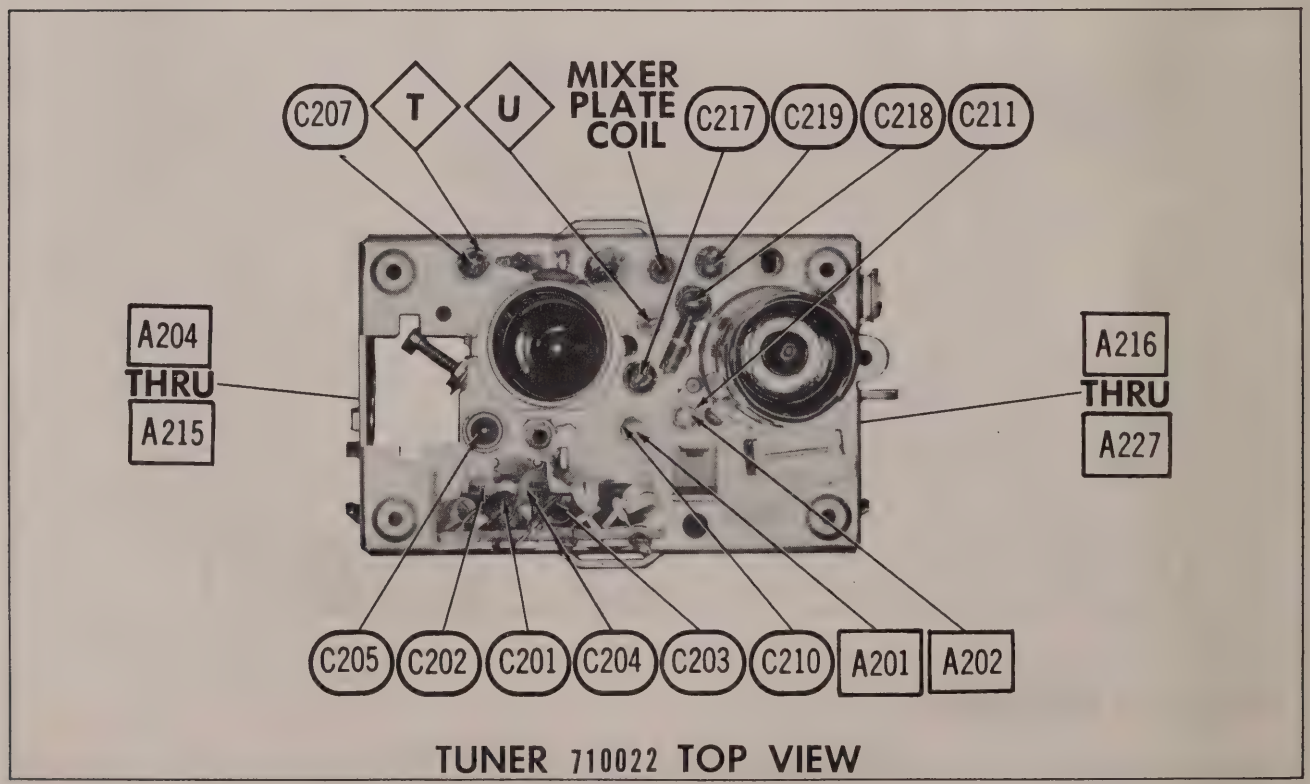
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

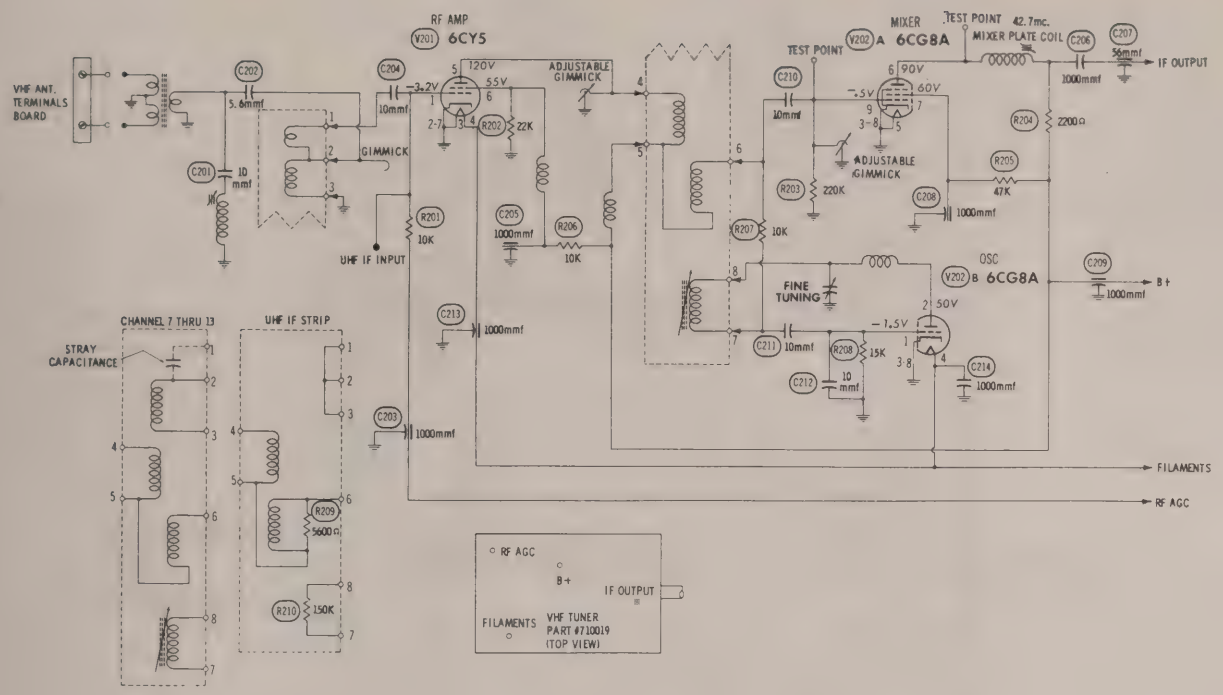
ITEM No.	RATING	REMARKS
R201	47K	
R202	1000Ω	
R203	2700Ω	

ITEM No.	RATING	REMARKS
R204	220K	
R205	1000Ω	
R206	4700Ω	

ITEM No.	RATING	REMARKS
R207	4700Ω	



TUNER 710022 TOP VIEW



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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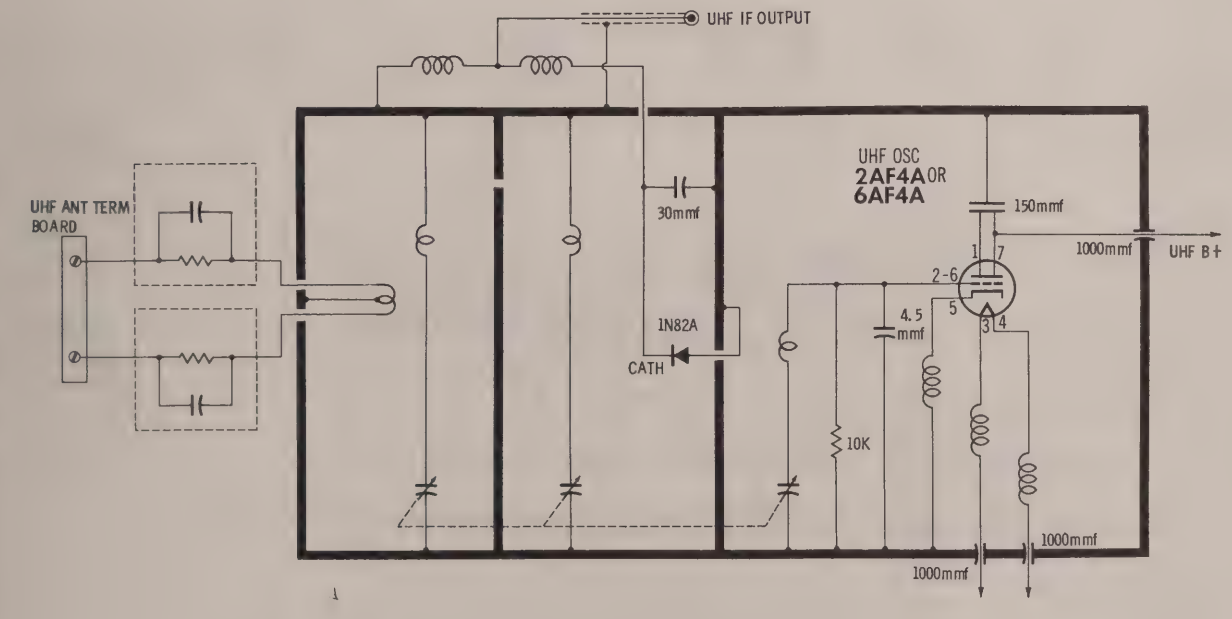
VHF TUNER 710019, 710021



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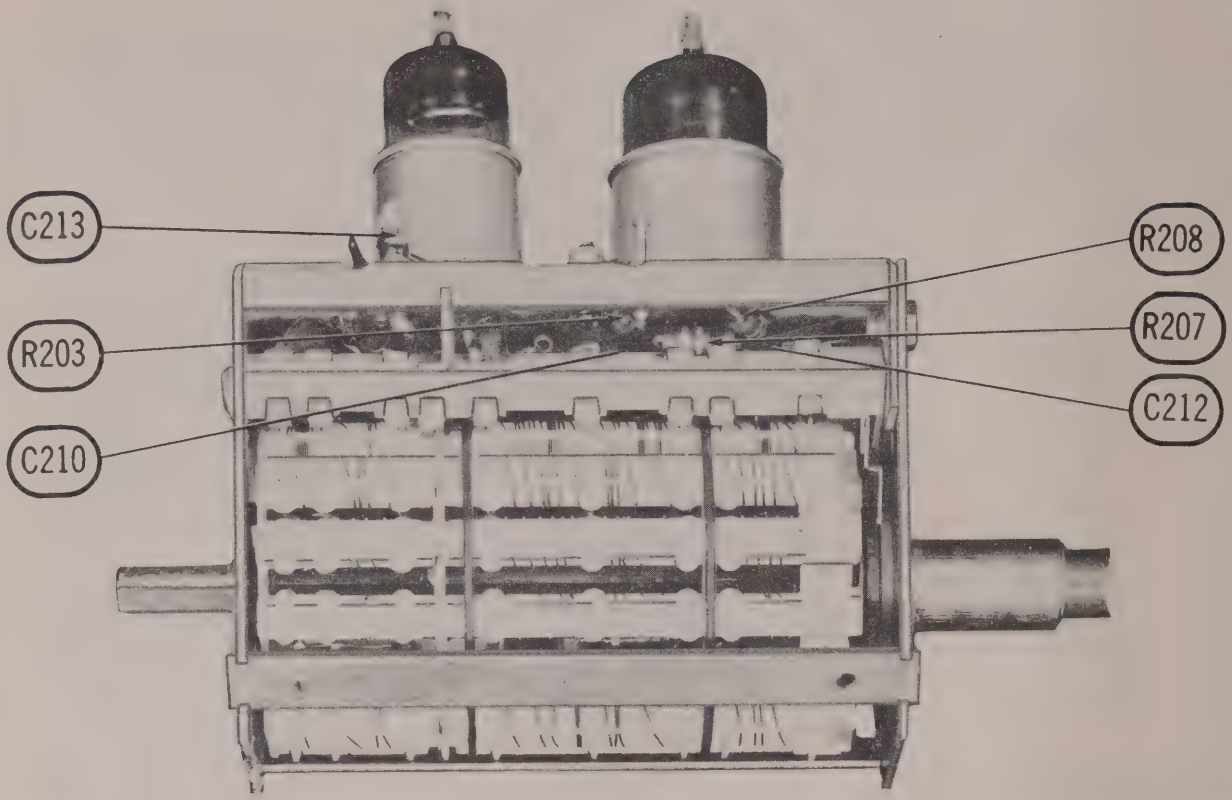
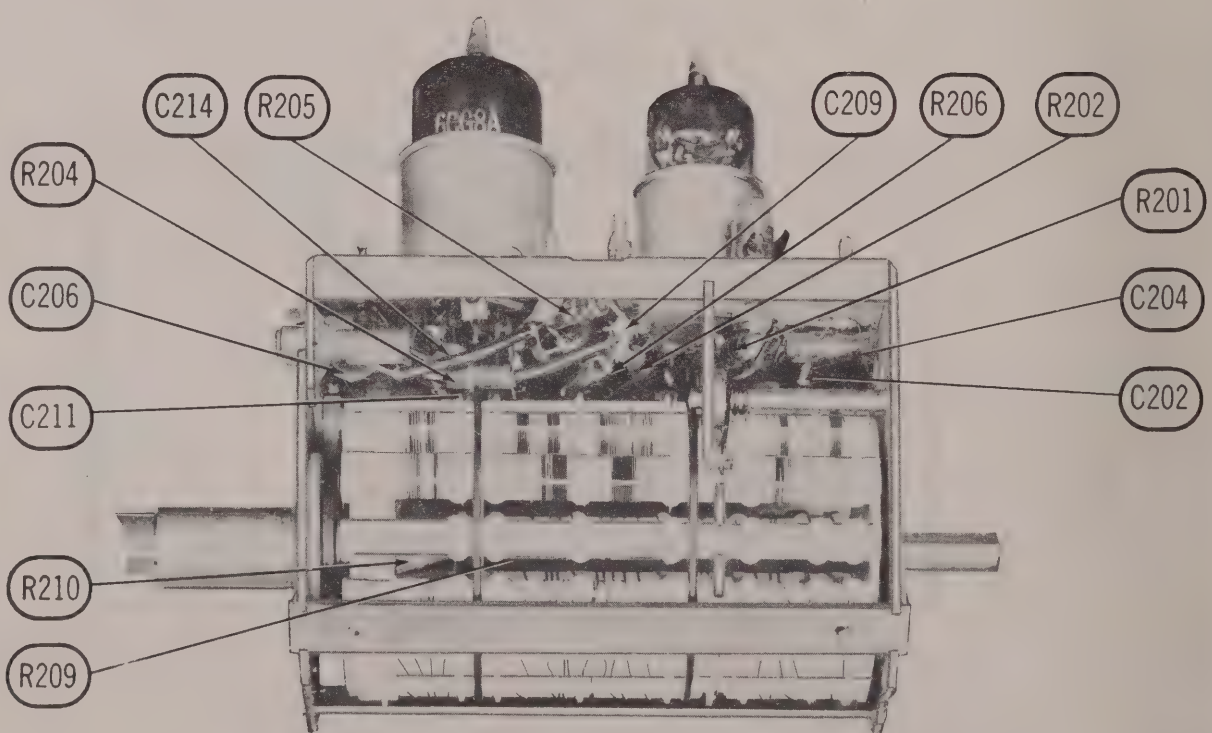
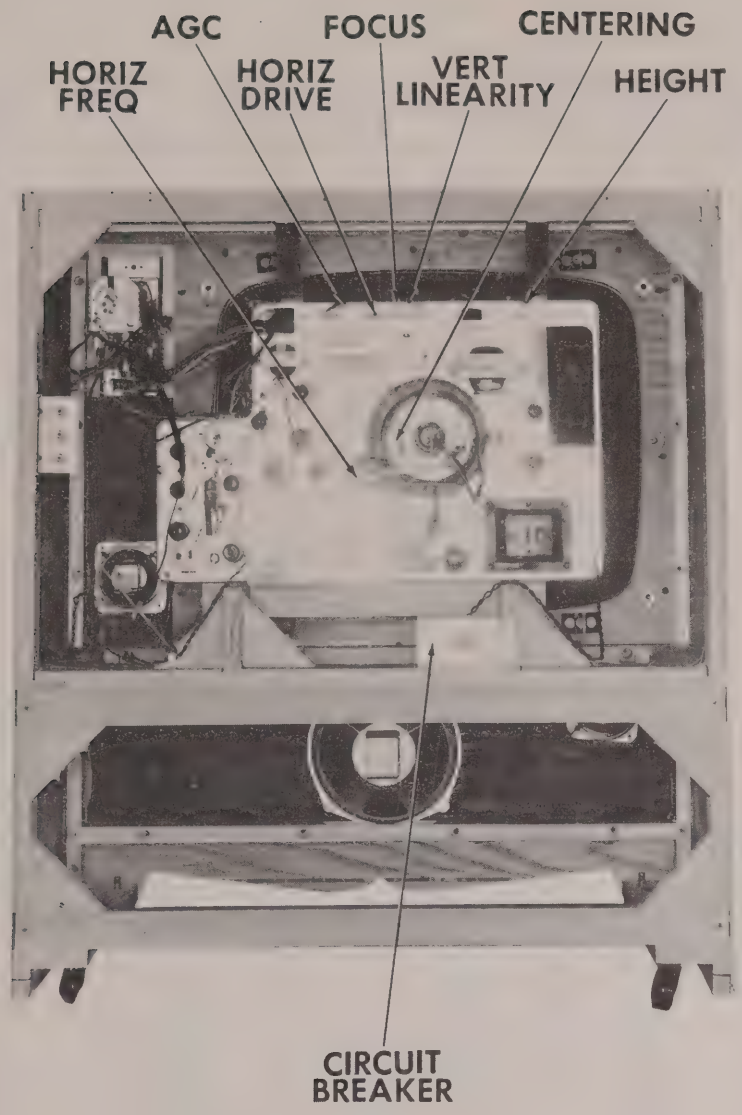
UHF TUNER 712013



TUNER 710019 - LEFT SIDE



TUNER 710019 - RIGHT SIDE



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the Brightness and Contrast controls for a normal picture.

Turn the Horizontal Frequency slug clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

Turn the Horizontal Frequency slug slowly counterclockwise until the picture just falls into sync.

Turn to an unused channel. If vertical lines appear near the center of the screen, slowly adjust the Horizontal Drive (R5) until white lines disappear.

If the Horizontal Drive was adjusted, tune in a TV station and repeat the above procedure. Check Horizontal sync by switching off channel and back again.

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No	CBS · GENERAL ELECTRIC · USE	TYPE	ITEM No	RAYTHEON · SYLVANIA · USE	TYPE
V1	1st Video IF Amp.	6BZ6	V9	Vert. [illegible]	6CG7
V2	2nd Video IF Amp.	6BZ6	V10	Vert. Output	[illegible]
V3	3rd Video IF Amp. - Video Det.	6AM8A	V11	Horiz. Mult.	6CG7
V4	Video Output-AGC Keying	6AW8A	V12	Horiz. Output	6DQ6A
V5	Sound IF Amp. -Sync Sep.	6U8A	V13	Damper	6DA4 (6DA4/6DE4) *
V6	Ratio Det. -AF Amp.	6BN8	V14	HV Rect.	1B3GT (1B3GT/1G3GT) *
V7	Audio Output	KL84/6BQ5	V15	LV Rect.	5U4GB
V8	Sync Phase Inv.-Horiz. AFC	6BJ8			

* Alternate .

PICTURE TUBE

ITEM No	REPLACEMENT DATA: HOFFMAN PART No	GENERAL ELECTRIC PART No	RCA PART No	RAYTHEON PART No	SYLVANIA PART No	NOTES
V16	23CP4		23CP4 ①		23CP4 ②	① Aluminized. ② "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	VOLT	REPLACEMENT DATA: HOFFMAN PART No	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	400	857105	AFH4-58-75	C0370 BR3035	FP430.46	TMT-34 TD-20-350	TVL8-4657.8*	
B	▲40	350							
C	▲20	300							
D	20	300							
C2A	▲100	350	857104	AFH4-05-80	D0044	FP425.6	TMQ-194	TVL8-4635.10*	
B	▲40	350							
C	10	350							
D	▲10	350							
C3	5	50	856006	PRE310	BBR5-50	TC30	TD-5-50	TVA-1303	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	4700		BPD-0047	DD-472	BYA10D47M	CCD-473	GP247	5HK-D47
C5	4700		BPD-0047	DD-472	BYA10D47M	CCD-473	GP247	5HK-D47
C6	.22 200V		P388N-22		CUB2F23	2DP-3-223	GEM-3023	2TM-P23
C7	56 N750 5%			TCN-56	C10Q56C		CN7-456	10TCC-Q56
C8	470 10%		DL-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C9	470 10%		DL-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C10	.47 200V		P388N-47		CUB2P47	2DP-5-474	GEM-3047	2TM-P47
C11	33 NPO		NPO-DI 33	DTZ-33	C10Q33C	CCTO-330	CNO-433	10TCC-Q33
C12	470 10%		DL-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C13	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C14	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C15	470 10%		DL-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C16	470 10%		DL-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C17	1000		BPD-001	DD-103	BYA10D1	CCD-103	GP210	5HK-D10
C18	1000		BPD-001	DD-103	BYA10D1	CCD-103	GP210	5HK-D10
C19	47 NPO		NPO-DI 47	DTZ-47	C10Q47C	CCTO-470	CNO-447	10TCC-Q47
C20	470 10%		DL-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C21	470 10%		DL-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C22	1000		BPD-001	DD-103	BYA10D1	CCD-103	GP210	5HK-D10
C23	1000		BPD-001	DD-102	BYA10D1	CCD-103	GP210	5HK-D10
C24	4.7 10%		NPO-SI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C25	4.7 10%		NPO-SI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C26	1000		BPD-001	DD-103	BYA10D1	CCD-102	GP210	5HK-D10
C27	4700		BPD-0047	DD-472	BYA10D47M	CCD-473	GP247	5HK-D47
C28	220 10%		DL-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C29	220 10%		DL-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C30	47 10%		DL-47	DD-470	L10Q47	CCD-470	GP247	10TS-Q47
C31	.1 400V		P388N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	5TM-P1
C32	4700		BPD-0047	DD-472	BYA10D47M	CCD-473	GP247	5HK-D47
C33	.047 200V		P388N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C34	82 3000V N750 10%	#850103						
C35	24 2000V 10%	Note 1			VCM-20-340K	3DY-422		
C36	4700		BPD-0047	DD-472	BYA10D47M	CCD-473	GP247	5HK-D47
C37	47 10%		DL-47	DD-470	L10Q47	CCD-470	GP247	10TS-Q47
C38	4.7 10%		NPO-SI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C39	47 10%		DL-47	DD-470	L10Q47	CCD-470	GP247	10TS-Q47
C40	2.2 10%		NPO-SI 2.2	TCZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C41	4700		BPD-0047	DD-472	BYA10D47M	CCD-473	GP247	5HK-D47
C42	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	GP247	5HK-D47
C43	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C44	4700		BPD-0047	DD-472	BYA10D47M	CCD-473	GP247	5HK-D47
C45	10000		BPD-01	DD-103	BYA10S	CCD-103	GP110	5HK-S10
C46	5600		DL-5600	DD-562	1W5D62	CCD-562	GP256	10TS-D56
C47	10000		BPD-01	DD-103	BYA10S	CCD-103	GP110	5HK-S10
C48	820 10%		DL-820	DD-821	1R5T82	CCD-821	GP382	10TS-T82
C49	470 10%		DL-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C50	1000		BPD-001	DD-103	BYA10D1	CCD-103	GP210	5HK-D10
C51	5600		DL-5600	DD-562	1W5D56	CCD-562	GP256	10TS-D56
C52	.01 400V		P488N-01	DS-103	CUB4S1	4DP-5-103	GEM-411	5TM-S1
C53	3300		BPD-0033	DD-333	BYA10D33	CCD-333	GP233	5HK-D33
C54	.0022 400V		P488N-0022	DS-223	CUB6D22	6DP-1-223	GEM-6223	6TM-D22
C55	220 N750 10%		N750-DI 220	DTZ-220	C10T22U	CCTN-221	CNT-522	10TCU-T22
C56	100 10%		DL-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C57	.001 400V 10%		V84C6DI-10%	DD-102	PM6DI	6DP-1-102	GEM-162I	6TM-DI
C58	.001 400V 10%		V84C6SI-10%	DD-102	PM6SI	6DP-1-102	GEM-162I	6TM-DI
C59	.0047 300V 10%		V84C6D47-10%		PM6D47	6DP-1-472	GEM-16247	6TM-D47
C60	.047 300V		P388N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C61	.0047 600V 10%		V84C6D47-10%		PM6D47	6DP-1-472	GEM-16247	6TM-D47
C62	220 N750 10%		N750-DI 220	DTZ-220	C10T22U	CCTN-221	CNT-522	10TCU-T22
C63	.1 600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-611	6TM-P1
C64	.022 600V		P688N-022	DD-203	CUB6S22	6DP-2-223	GEM-6122	6TM-S22
C65	30000		BPD-03	DD-303	BYD6S2	CCD-303	GP130	5HK-S3

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C66	.022 600V		P688N-022	DD-[illegible]	CUB6S22	6DP-2-223	GEM-6122	6TM-S22
C67	.01 1600V		P1684CM-01	[illegible]	CUB16S1	16DP-3-103	GEM-1611	MB-S1
C68	.22 200V		P388N-22		CUB2P22	2DP-4-224	GEM-3022	2TM-P22
C69	.0047 300V 10%		V84C3D47-10%		PM6D47	6DP-1-472	GEM-16247	6TM-D47
C70	.047 200V		P388N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C71	3900 10%		1464-0039		1R5D39	CM-30B-392K	MCJ462 S	MS-239
C72	100 10%		1469-0001	DD-101	22R1D1	CM-30B-101K	MCB235	MS-310
C73	470 10%		1469-00047	DD-471	5R5T47	CM-30B-471K	MCJ344	MS-347
C74	330 10%		1469-00033	DD-331	5R5T33	CM-30B-331K	MCB241	MS-333
C75	.1 200V		P388N-1	DF-104	CUB2P1	2DP-3-104	GEM-301	2TM-P1
C76	.001 400V 10%		V84C4DI-10%		PM6DI	6DP-1-102	GEM-162I	6TM-DI
C77	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C78	.1 600V		P688N-1	DF-104	CUB6P1	6DP-4-104	GEM-601	6TM-P1
C79	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C80	.068 600V		P688N-068		CUB6S68	6DP-4-683	GEM-6168	6TM-S68
C81	170 3000V 10%	#850109					3DY-310	
C82	170 3000V 10%	#850109						
C83	100 3000V 5%							
C84	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47

Hoffman Part Number. Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: HOFFMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	300Ω	½	802040					Contrast
B	500K	½						Volume
	250K tap							
C	Switch							Push-Pull Off-On
R2A	1.5meg	½	802045	F1-64		▲ QJ-1141	● UE4083	Vert. Hold
B	150K	½		R2-33				Brightness
R3A	1meg	½	800069					Tone
B	Switch							TV-Phono Switch
R4A	100K	½	800038	AB-40	B47-10K-S	BIL-138	PTA15L	AGC
B	Shaft			AK-19	Not Req.	TM4	Not Req.	
R5A	10K	½	800060	AB-14	B47-10K-S	BIL-116	BU-30	Horiz. Drive
B	Shaft			AK-19	Not Req.	TM4	Not Req.	
R6A	4meg	½	800061	AB-98	B47-5meg-S	BIL-340	PTA56L	Focus
B	Shaft			AK-19	Not Req.	TM4	Not Req.	
R7A	1meg	½	800039	AB-89	B47-1meg-S	BIL-137	PTA154L	Vert. Lin.
B	Shaft			AK-19	Not Req.	TM4	Not Req.	
R8A	1meg	½	800039	AB-89	B47-1meg-S	BIL-137	PTA154L	Height
B	Shaft			AK-19	Not Req.	TM4	Not Req.	

† "Concentrikit" Equivalent: K-8 Kit with Base Elements & Shafts: BIL-138, P17-120 (Panel) BIL-326, R1-200 (Rear)

■ "STA-LOC" Equivalent: FA155L, RU154L, OF1625, IS215.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise stated.

ITEM No.	RATING	REMARKS
R9	47K	
R10	2.7meg	
R11	470K	
R12	470K	
R13	15K	
R14	1600Ω	Note 1
R15	470Ω	Note 2
R16	470Ω	
R17	470Ω	
R18	47K	
R19	2200Ω	
R20	47Ω	
R21	470Ω	
R22	33K	
R23	2200Ω	
R24	47Ω	
R25	15K	
R26	22K	
R27	150Ω	
R28	1000Ω	
R29	12K	
R30	4700Ω	
R31	22K 2W	
R32	820Ω 1W	
R33	4700Ω 4W	
R34	39K	
R35	330K	
R36	220K	
R37	22K	
R38	47K	

ITEM No.	RATING	REMARKS
R39	47K 1W	
R40	15K	
R41	4700Ω	
R42	220Ω	
R43	47K	
R44	6800Ω	
R45	68K	
R46	4.7meg	
R47	330K	
R48	22K	
R49	1000Ω	
R50	680K	
R51	39K 1W	
R52	18000 2W	
R53	100Ω	
R54	100Ω	
R55	33K	
R56	330K	
R57	2.2meg	
R58	120K	
R59	2200Ω 1W	
R60	2200Ω 1W	
R61	2200Ω 1W	
R62	1800Ω 1W	
R63	560Ω	
R64	22K	
R65	68K 1W	
R66	1000Ω 5%	
R67	1.2meg	
R68	680K 1W	

ITEM No.	RATING	REMARKS
R69	27K 1W	
R70	47K 1W	
R71	22K	
R72	100Ω	
R73	2200Ω	
R74	4700Ω	
R75	220Ω	
R76	220Ω	
R77	3Ω (Cold)	
R78	15Ω 2W	
R79	100K	
R80	100K	
R81	470K	
R82	4.7meg	
R83	6800Ω	
R84	1500Ω 5%	
R85	100K	
R86	100K	
R87	6800Ω	
R88	100Ω	
R89	470K	
R90	10K 2W	
R91	22K	
R92	2.2Ω	
R93	2500Ω 10W	#825439
R94	1000Ω 10W	#825377
R95	1000Ω 1W	
R96	1meg	
R97	1.5meg	
R98	330K	

Hoffman Part No. Note 1. Not used with Tuner Part #710021. Note 2. 1000Ω 1W used with Tuner Part #710021.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	HOFFMAN PART No.	REPLACEMENT DATA	
K1	Vert. Integrator	2000mmf, 5000mmf, 5000mmf, 820Ω, 820Ω, 22K	986001	Aerovox	PA-110
				Centralab	PC-100
				Cornell-Dubilier	11STM1
				Mallory	MS-100
				Sprague	V1/V3

COILS (RF-IF)

ITEM No	USE	REPLACEMENT DATA: HOFFMAN PART No	Gramer PART No	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No	NOTES
L1A	1st Video IF	763013						
B	47.25MC Trap							
L2	2nd Video IF	763017	17-4523	17-4523	TV-130	6219	VF-3	
L3A	3rd Video IF	763025	17-4536	17-4536		6222		
B	47.25MC Trap							
L4	4th Video IF	763019	17-5004	17-5004	TV-126	6234		
L5	RF Choke	750014	19-1004	19-1004	BC-585	4610		6.8uh ①
L6	Series Peaking Coil	771008	19-3100	19-3100	TV-181	6112	VP-3	100uh
L7	Shunt Peaking Coil	771019			TV-207	6156		630uh
L8	4.5MC Trap	763005	20-1004	20-1004	TV-151	1469 *	SF-3	
L9	Series Peaking Coil	771013	19-4301	19-4301	TV-197	6154		220uh
L10	Sound IF	763005	20-1004	20-1004	TV-151	1469 *	SF-3	
L11	Ratio Detector	774006	17-3497	17-3497	TV-115	6205	SD-4 ▲	
L12	Fil. Choke	750015	19-1001	19-1001	BC-562	4604		1.5uh ①

* Disregard tap. ▲ Remove C40 (3.2mmf cap.) ① IRC Part #CLA.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	NOTES
L13	52Ω		768017	[illegible]	TV-163	6210	H-102	SS-5	Horiz. Stab.

TRANSFORMER (POWER)

ITEM No	RATING			REPLACEMENT DATA: HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
	PRI.	SEC. 1	SEC. 2							
T1	117V ② 1.9A	580VCT ③ .300A	5V ④ 3A	768020-1 ①						R-80BC ②
	SEC. 3	SEC. 4	SEC. 5							
	6.3V ④ 6A	6.3V ⑤ 9.5A								

① Alternate Part #716020.

② Phase and Parallel 8A and 5A Filament Windings.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: HOFFMAN PART No.	Halldorson PART No	Merit PART No	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
T2	Vert. Output	728010						
T3	Yoke-Horiz. (8.8MH) (110°)-Vert. (13.2MH)	790009	Y-48 ①②		Y-110 ①③		DY-27A ① ②	Y-48 ①②	Y-60 & NW-12 ②
T4	Horiz. Output	782009	FLY-150 ④ *	HVO-116 ④ *	X166 *		HO-289 *	FLY-150 ④ *	D-180 *

① Use original rear cover, centering device, and yoke damping network, if necessary.
② Use original yoke plug and connect same as original.
③ Connect yoke terminal #2 to yoke plug pin #3, yoke #1 and #3 to plug #5, yoke #10 to plug #8.
④ Drill new mounting hole(s).

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
8	5	5	5		5	5	5
7	4	4	4		4	4	4
6	3	3	3		3	3	3
1	1	1	1		1	1	1

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No	NOTES
T5	8000Ω	3-4Ω	724021	26S48	A-3020	AU-800	A-3823	25S48	S-9Z	

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: HOFFMAN PART No.	QUAM PART No.	NOTES
SP1	8"	PM	3-4Ω	708601	8A31	All Models except B3653, M3653, SP3653, W3653
SP2	3½"	PM	7-9Ω	708009	3A0728.4	All Models
SP3	3½"	PM	7-9Ω	708009	3A0728.4	All Models
	4" x 6"	PM		708903		Models B3653, M3653, SP3653, W3653

HOFFMAN CHASSIS 348, 350

FOLDER 1

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
M1	Tuner	710022	VHF, Chassis 350
	Tuner	710021	VHF, Chassis 348
	Tuner	712013	UHF
M2	Circuit Breaker	953001	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Mask	527002	All "W" Models
Mask	527003	All "M" Models
Mask	527004	All "B" Models
Mask	527005	All "SP" Models
Knob	480070	Channel Selector
Knob	496014	Fine Tuning
Knob	508017	Off-On Volume, Brightness
Knob	512024	Contrast, Vert. Hold
Knob	508019	Tone
Cabinet	354064	Model W3653
Cabinet	352069	Model W3663
Cabinet	354060	Model W3673
Cabinet	352073	Model W3683
Cabinet	354065	Model M3653
Cabinet	352070	Model M3663
Cabinet	354061	Model M3673
Cabinet	352074	Model M3683
Cabinet	354066	Model B3653
Cabinet	352071	Model B3663
Cabinet	354062	Model B3673
Cabinet	352075	Model B3683
Cabinet	354067	Model SP3653
Cabinet	352072	Model SP3663
Cabinet	354063	Model SP3673
Cabinet	352076	Model SP3683

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor)
		8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors
		8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor
		8485 (Round) - 5 Conductor
		8488 (Round) - 8 Conductor

TUNER

710019 , 710021

ALIGNMENT INSTRUCTIONS

TUNER ALIGNMENT

Suggested Alignment Tools:	GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987 WALSCO #2531

VHF OSCILLATOR ALIGNMENT

The individual channel adjustment screws are accessible one at a time, thru a hole in the front of the tuner, as the Channel Selector is rotated. Set the Fine Tuning to the center of its range and switch to channel to be adjusted. Adjust for best picture and sound.

VHF RF AND MIXER ALIGNMENT

This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amplifier	6CY5	V202	Mixer - Osc.	6CG8A

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	10		DI-10	DD-100	L10Q1	CCD-100	CNO-410	10TS-Q10
C202	5.6					*		
C203	1000		EF-001	MFT-1000		CCF-102	CT280A	
C204	10		DI-10	DD-100	L10Q1	CCD-100	CNO-410	10TS-Q10
C205	1000		EF-001	MFT-1000		CCF-102	CT280A	
C206	1000		BPD-001	DD-102	BYA10D1M	CCD-102	B-210	5HK-D10
C207	56					*		
C208	1000		EF-001	MFT-1000		CCF-102	CT280A	
C209	1000		EF-001	MFT-1000		CCF-102	CT280A	
C210	10		DI-10	DD-100	L10Q1	CCD-100	CNO-410	10TS-Q10
C211	10		DI-10	DD-100	L10Q1	CCD-100	CNO-410	10TS-Q10
C212	10		DI-10	DD-100	L10Q1	CCD-100	CNO-410	10TS-Q10
C213	1000		EF-001	MFT-1000		CCF-102	CT280A	
C214	1000		BPD-001	DD-103	BYA10D1M	CCD-102	B-210	5HK-D10

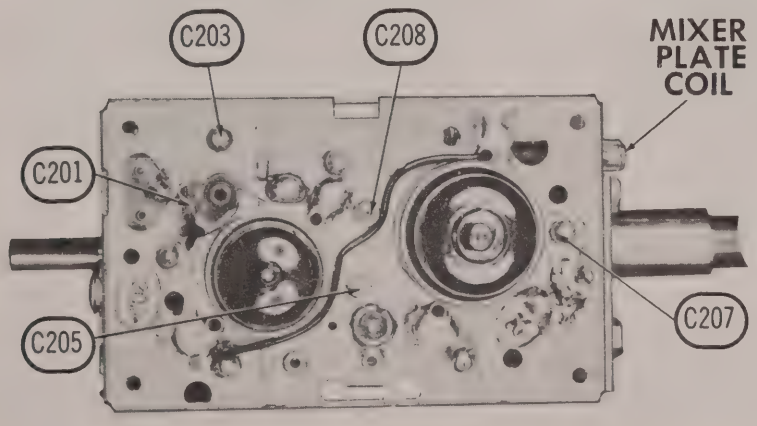
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

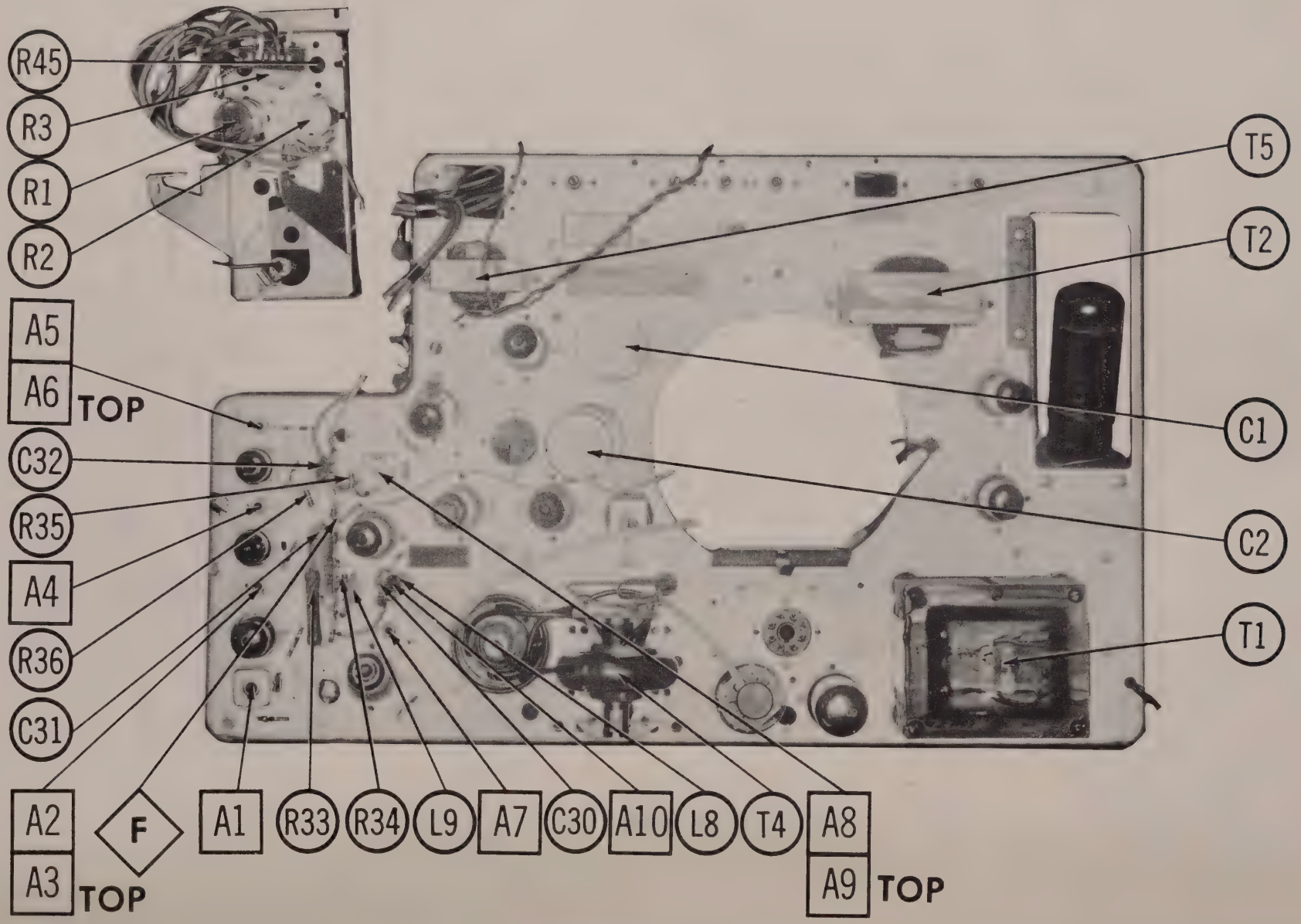
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		HOFFMAN PART No.	NOTES
	OHMS	WATT		
R201	10K			
R202	22K			
R203	220K			
R204	2200Ω			
R205	47K			

ITEM No.	RATING		HOFFMAN PART No.	NOTES
	OHMS	WATT		
R206	10K			
R207	10K			
R208	15K			
R209	5600Ω			
R210	150K			



TUNER 710019 TOP VIEW



CHASSIS - TOP VIEW

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Connect negative lead of a 60 volt bias supply to pin 5 (grid) of the Horizontal Output Tube. Positive to chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: Al thru A7, A10 ... GENERAL CEMENT 8282, 8606, 8606L, 9295
WALSCO #2526, 2543, 2544, 2545
A8, A9 ..... GENERAL CEMENT #5097, 8727
WALSCO #2515

VIDEO IF ALIGNMENT

Set Contrast fully counterclockwise.
Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough generator output to provide a usable indication on VTVM.
Use only enough sweep generator output to provide a usable pattern on scope.
Connect a 1000mmf capacitor across VTVM leads.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	High side to ungrounded tube shield floating over Mixer-Osc. (V202). Low side to chassis.	Not used	43.75MC (Unmod)	Between channels	USE VTVM DC probe thru 10K to point (B). Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	45.25MC	"	"	A2	"
3.	"	"	47.25MC	"	"	A3	Adjust for MINIMUM deflection using maximum core separation.
4.	"	"	43.25MC	"	"	A4	Adjust for maximum deflection.
5.	"	"	43.75MC	"	"	A5	"
6.	"	"	47.25MC	"	"	A6	Adjust for MINIMUM deflection using maximum core separation.
7.	"	"	45.50MC	"	"	Mixer Plate Coil	Adjust for maximum deflection.
8.	"	44.0MC (10MC Swp)	45.0MC 45.75MC	"	USE SCOPE Vert. Amp. thru 10K to point (B). Low side to chassis.		Check for response curve similar to Fig. 1 with markers as indicated. If necessary, retouch A2, A3 and A4 SLIGHTLY to obtain desired results.

SOUND IF ALIGNMENT

Connect two matched 100K (±1%) resistors in series from point (C) to chassis. The junction of these two resistors is alignment point (E) as shown on the schematic.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	High side thru .005mfd to point (B). Low side to chassis.	4.5MC (Unmod)	Between Channels	DC probe thru 100K to point (C). Common to chassis.	A7, A8	Adjust for maximum deflection.
10.	"	"	"	DC probe to point (D). Common to point (E).	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

4.5MC TRAP ALIGNMENT

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
11.	High side thru .005mfd to point (B). Low side to chassis.	4.5MC (Unmod)	Between Channels	RF probe to point (F). Common to chassis.	A10	Adjust for MINIMUM deflection.

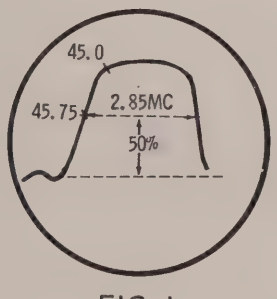


FIG. 1

TUNER ALIGNMENT INSTRUCTIONS

710022

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201 thru A203 ..... GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537
A216 thru A227..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
WALSCO #2531
A204 thru A215 ..... None Required

VHF RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Connect the negative lead of a 4.5 volt bias supply to point ⓣ. Positive to chassis.
Use only enough sweep generator output to provide a usable pattern on scope.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Use 10MC sweep unless otherwise noted.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point ⓓ. Low side to chassis.	A201, A202, A203	Adjust A201 and A202 for maximum amplitude and symmetry with markers as shown in Fig. 201. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A203 to obtain MINIMUM response on the scope.
2.	"	213MC	211.25MC 215.75MC	13	"	A204	Adjust for maximum amplitude of response similar to Fig. 201. Adjust by expanding or compressing coil turns.
		207MC	205.25MC 209.75MC	12		A205	
		201MC	199.25MC 203.75MC	11		A206	
		195MC	193.25MC 197.75MC	10		A207	
		189MC	187.25MC 191.75MC	9		A208	
		183MC	181.25MC 185.75MC	8		A209	
		177MC	175.25MC 179.75MC	7		A210	
		85MC	83.25MC 87.75MC	6		A211	
		79MC	77.25MC 81.75MC	5		A212	
		69MC	67.25MC 71.75MC	4		A213	
		63MC	61.25MC 65.75MC	3		A214	
		57MC	55.25MC 59.75MC	2		A215	

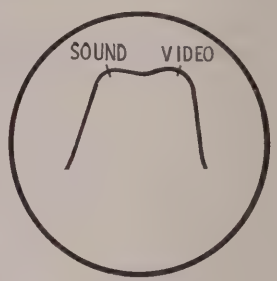


FIG.201

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. load.	A216	Adjust to place sound marker in trap notch as in Fig. 202. Video marker should fall at 50%.
		207MC	205.25MC 209.75MC	12		A217	
		201MC	199.25MC 203.75MC	11		A218	
		195MC	193.25MC 197.75MC	10		A219	
		189MC	187.25MC 191.75MC	9		A220	
		183MC	181.25MC 185.75MC	8		A221	
		177MC	175.25MC 179.75MC	7		A222	
		85MC	83.25MC 87.75MC	6		A223	
		79MC	77.25MC 81.75MC	5		A224	
		69MC	67.25MC 71.75MC	4		A225	
		63MC	61.25MC 65.75MC	3		A226	
		57MC	55.25MC 59.75MC	2		A227	

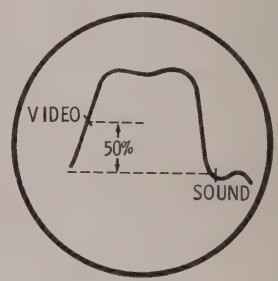
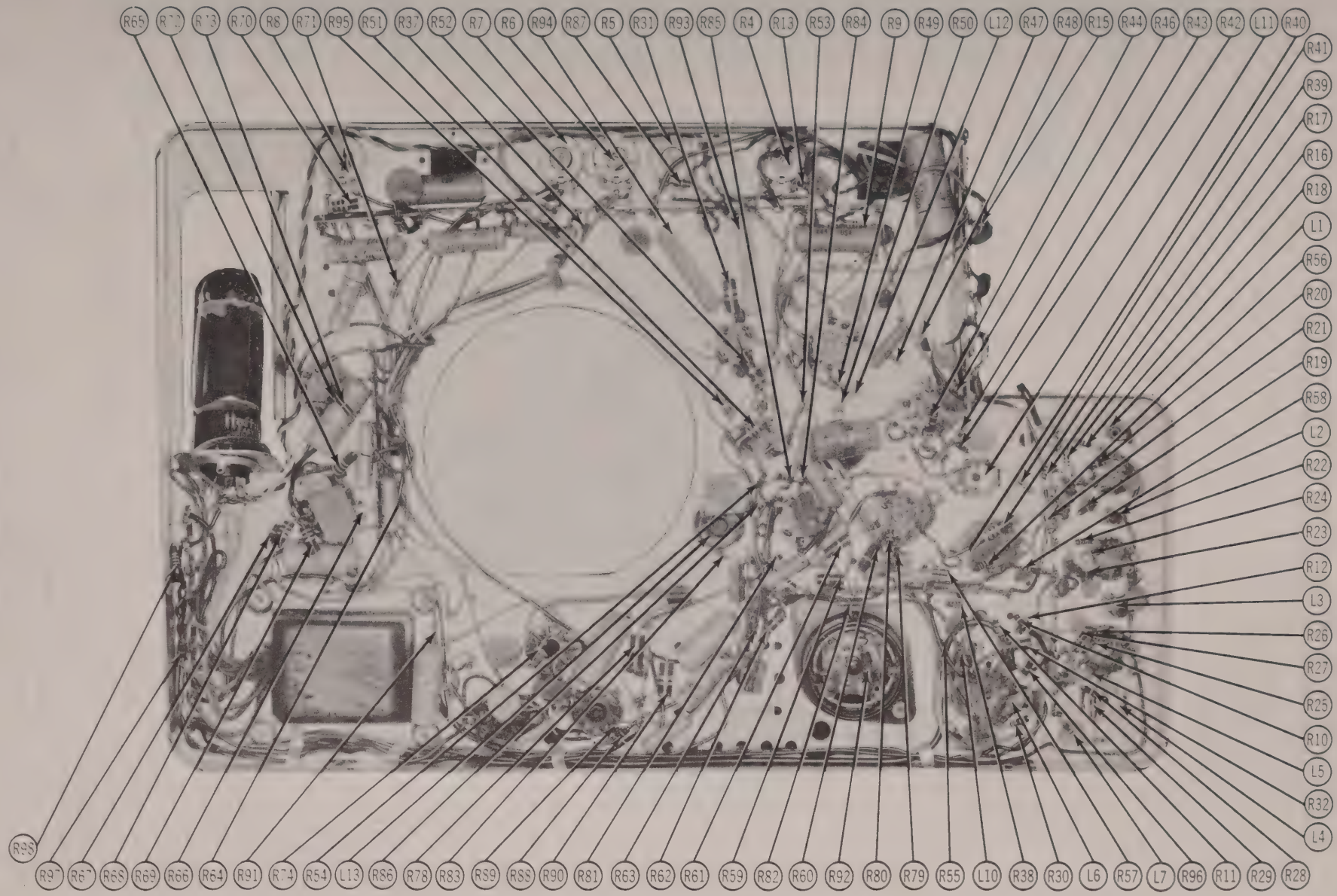


FIG.202

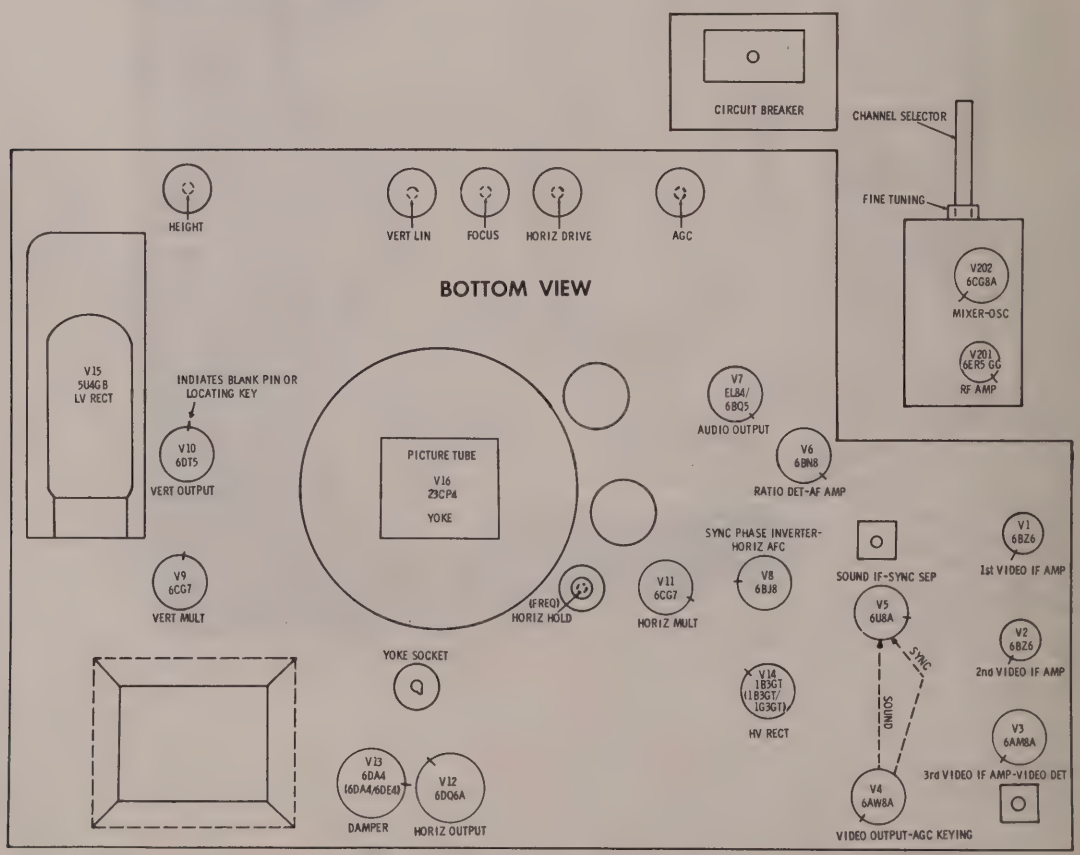


CHASSIS BOTTOM VIEW - RESISTOR & INDUCTOR IDENT.

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	100K	47Ω	.1Ω	0Ω	†4800Ω	†4800Ω	0Ω		
V2	6BZ6	100K	47Ω	.1Ω	0Ω	†4800Ω	†4800Ω	0Ω		
V3	6AM8A	150Ω	.2Ω	†25K	.1Ω	0Ω	†1100Ω	.3Ω	4700Ω	0Ω
V4	6AW8A	†100Ω	†920Ω	480K	650K	650K	• 20Ω	4700Ω	†22K	†5600Ω
V5	6U8A	†120K	47K	†40K	0Ω	.1Ω	†7300Ω	0Ω	0Ω	2.5meg
V6	6BN8	INF	0Ω	INF	0Ω	.1Ω	6800Ω	†370K	4.7meg	0Ω
V7	EL84/ 6BQ5	680K	680K	200Ω	0Ω	.1Ω	NC	†2100Ω	NC	†41K
V8	6BJ8	15Ω	4.8meg	15Ω	0Ω	.1Ω	4.8meg	†4500Ω	†120K	4600Ω
V9	6CG7	†68K	60K	1000Ω	0Ω	.1Ω	† 700K	• 1.7meg	1000Ω	0Ω
V10	6DT5	†3300Ω	NC	• 1.1meg	0Ω	.1Ω	1.1meg	0Ω	NC	†400Ω
V11	6CG7	†7900Ω	5.2meg	1500Ω	0Ω	.1Ω	†100K	100K	1500Ω	0Ω
V12	6DQ6A	NC	0Ω	NC	†10K	• 1.2meg	TP	.1Ω	0Ω	TOP CAP ‡15Ω
V13	6DA4	NC	NC	¶3.2meg	NC	†100Ω	NC	.1Ω	0Ω	
V14	1B3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP ‡380Ω
V15	5U4GB	NC	¶	NC	21Ω	NC	19Ω	NC	¶	
V16	23CP4	0Ω	22K	‡22K	• †140K	NC	NC	• 260K	.1Ω	
V201	6ER5/ GG	0Ω	900K	0Ω	.1Ω	†4100Ω	0Ω	0Ω		
V202	6CG8A	4700Ω	†9600Ω	0Ω	0Ω	.1Ω	†4100Ω	†4900Ω	0Ω	220K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 260V SOURCE.
‡ MEASURED FROM PIN 3 OF V13.
NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART

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SYLVANIA MODELS 23C17, 18, 19, 20, 21, 23T12, 13, 14 (Ch. 1-544-1, -2, -3)

SYLVANIA MODELS 23C17, 18, 19, 20, 21, 23T12, 13, 14 (Ch. 1-544-1, -2, -3)

MODEL 23T14 (Ch. 1-544-1, -2, -3)

SYLVANIA MODELS 23C17, 18, 19, 20, 21, 23T12, 13, 14 (Ch. 1-544-1, -2, -3)

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EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

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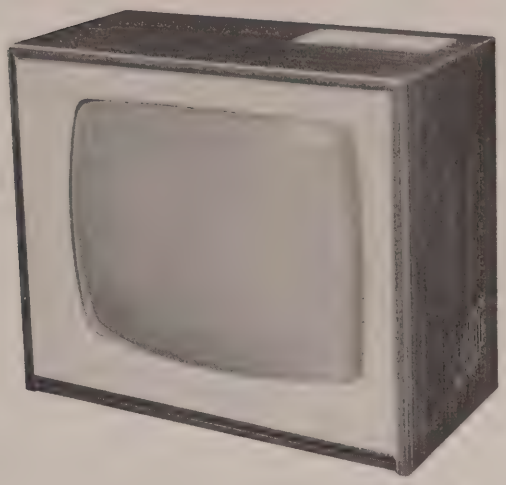
SYLVANIA MODELS 23C17, 18, 19, 20, 21, 23T12, 13, 14 (Ch. 1-544-1, -2, -3)



MODEL 23T14 (Ch. 1-544-1, -2, -3)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL FOR MODEL 23T14

1. Remove 14 metal screws holding the rear cover. Remove the rear cover.
2. Remove HaloLight leads, speaker leads, picture tube socket, HV lead, and vertical hold control extension.
3. Remove yoke clamp.
4. Loosen 2 metal screws at rear of cabinet holding chassis.
5. Lift chassis up and out.
6. Remove 2 clutch head screws at top left rear of cabinet holding tuner and control bracket.

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

TRADE NAME	Sylvania	MODELS	CHASSIS
		23C17, 23C18, 23C19, 23C20, 23C21, 23T12, 23T13, 23T14	1-544-1, -2, -3
MANUFACTURER	Sylvania Home Electronics, Div. of Sylvania Electric Products Inc., 700 Ellicott St. Batavia, N.Y.		
TYPE SET	Television Receiver		
TUBES	VHF-Seventeen, UHF-Eighteen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 170 Watts, 1.75 Amp. @ 117 Volts AC		
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

The safety glass is an integral part of the picture tube.

FUSE DEVICE

A Circuit Breaker is used for low voltage power supply protection, and may be reset by depressing the reset button. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENTS

To touch-up the VHF Oscillator, it is necessary to remove the chassis. (See "Disassembly Instructions".)

AGC

The AGC may be varied by means of an AGC control. (For location, see "Tube Placement Chart".)

FOCUS

The focus may be varied by means of a Focus control. (For location, see "Tube Placement Chart".)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Frequency slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

WIDTH

The width may be varied by a Width coil. (For location, see "Tube Placement Chart".)

BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Ratio Detector secondary (All) located on the bottom of chassis.

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

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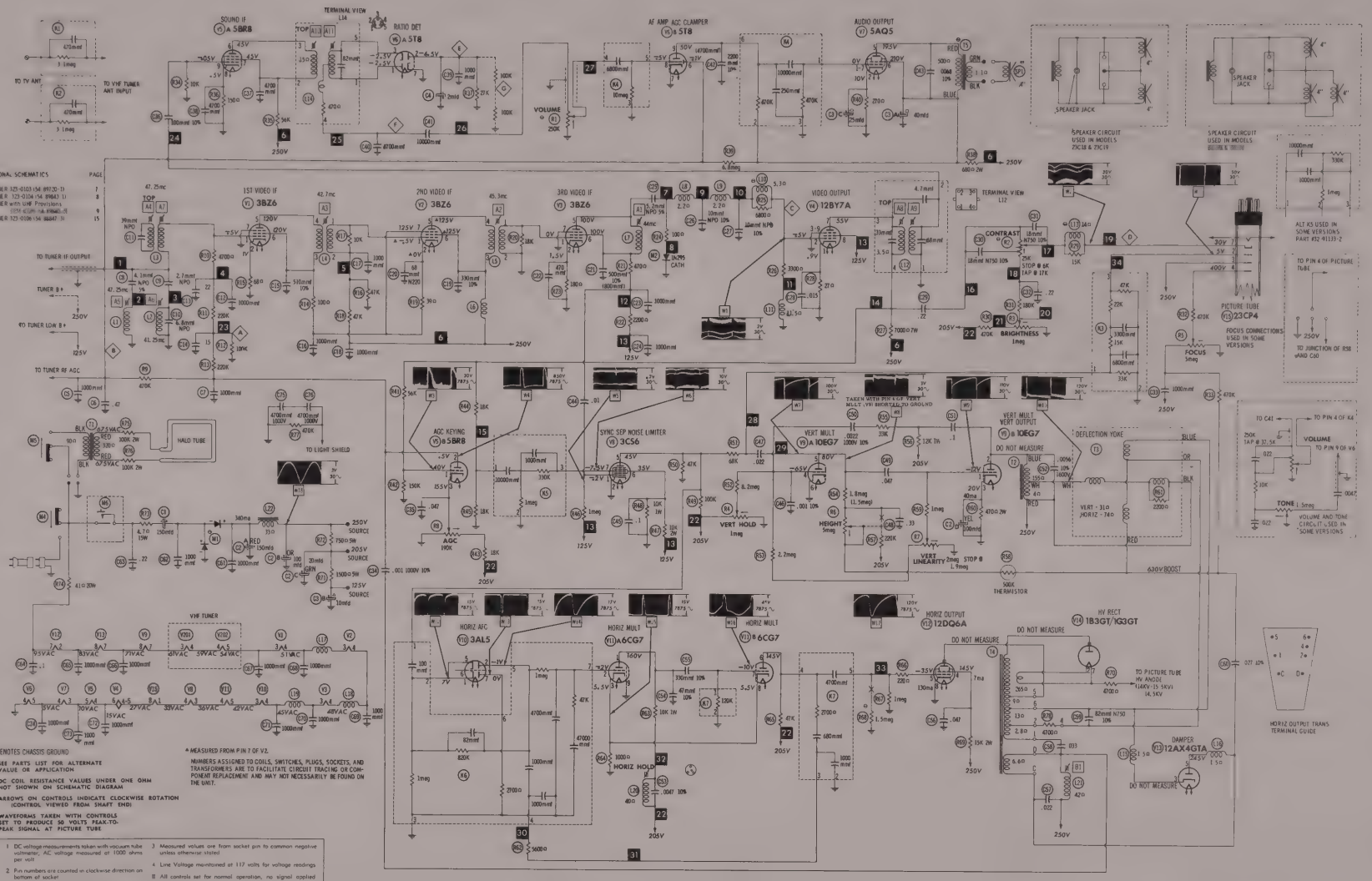
JA757

DATE 3-60 SET 477 FOLDER 2

SET 477 FOLDER 2


SOUND IF V5 6SR8
RATIO DET V6 6ST8
AF AMP AGC CLAMPER V6 6ST8
AUDIO OUTPUT V7 5AQ5
TERMINAL VIEW L14
TO TV ANT
TO VHF TUNER ANT INPUT
VOLUME R1 250K
SPEAKER JACK
SPEAKER CIRCUIT USED IN MODELS 23C18 & 23C19
SPEAKER CIRCUIT USED IN MODELS 23C17 & 23T12
ADDITIONAL SCHEMATICS
PAGE
VHF TUNER 325-0103-154 (89120-1)
UHF TUNER 325-0104-154 (89843-1)
VHF TUNER with UHF Provisions
VHF TUNER 325-0106-154 (89847-3)
1ST VIDEO IF V1 3BZ6
2ND VIDEO IF V2 3BZ6
3RD VIDEO IF V3 3BZ6
VIDEO OUTPUT V4 12BY7A
TERMINAL VIEW L12
CONTRAST R2
BRIGHTNESS R3
PICTURE TUBE V16 23CP4
FOCUS R5
FOCUS CONNECTIONS USED IN SOME VERSIONS
ALT K5 USED IN SOME VERSIONS PART #52-91133-2
TO PIN 4 OF PICTURE TUBE
TO JUNCTION OF R58 and C60
TO TUNER IF OUTPUT
TO TUNER B+
TO TUNER LOW B+
TO TUNER RF AGC
HALO TUBE
TO LIGHT SHIELD
AGC KEYING V5 6SR8
SYNC SEP NOISE LIMITER V8 3CS6
VERT MULT V9 A 10EG7
VERT MULT VERT OUTPUT V9 B 10EG7
DEFLECTION YOKE
VERT HOLD 1meg
HEIGHT 5meg
VERT LINEARITY 2meg STOP @ 1.1meg
500K THERMISTOR
630V BOOST
TONE 1.5meg
VOLUME AND TONE CIRCUIT USED IN SOME VERSIONS
TO C41
TO PIN 4 OF K4
TO PIN 9 OF V6
VHF TUNER
HORIZ AFC V10 3AL5
HORIZ MULT V11 A 6CG7
HORIZ MULT V11 B 6CG7
HORIZ OUTPUT V12 12DQ6A
HV RECT V14 1B3GT/1G3GT
TO PICTURE TUBE HV ANODE (14KV-15.5KV) (14.5KV)
DAMPER V13 12AX4GTA
HORIZ OUTPUT TRANS TERMINAL GUIDE
HORIZ HOLD 1meg
DO NOT MEASURE
TAKEN WITH PIN 6 OF VERT MULT V9B VERTICAL TO GROUND
DENOTES CHASSIS GROUND
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
MEASURED FROM PIN 7 OF V2.
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
1 DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE
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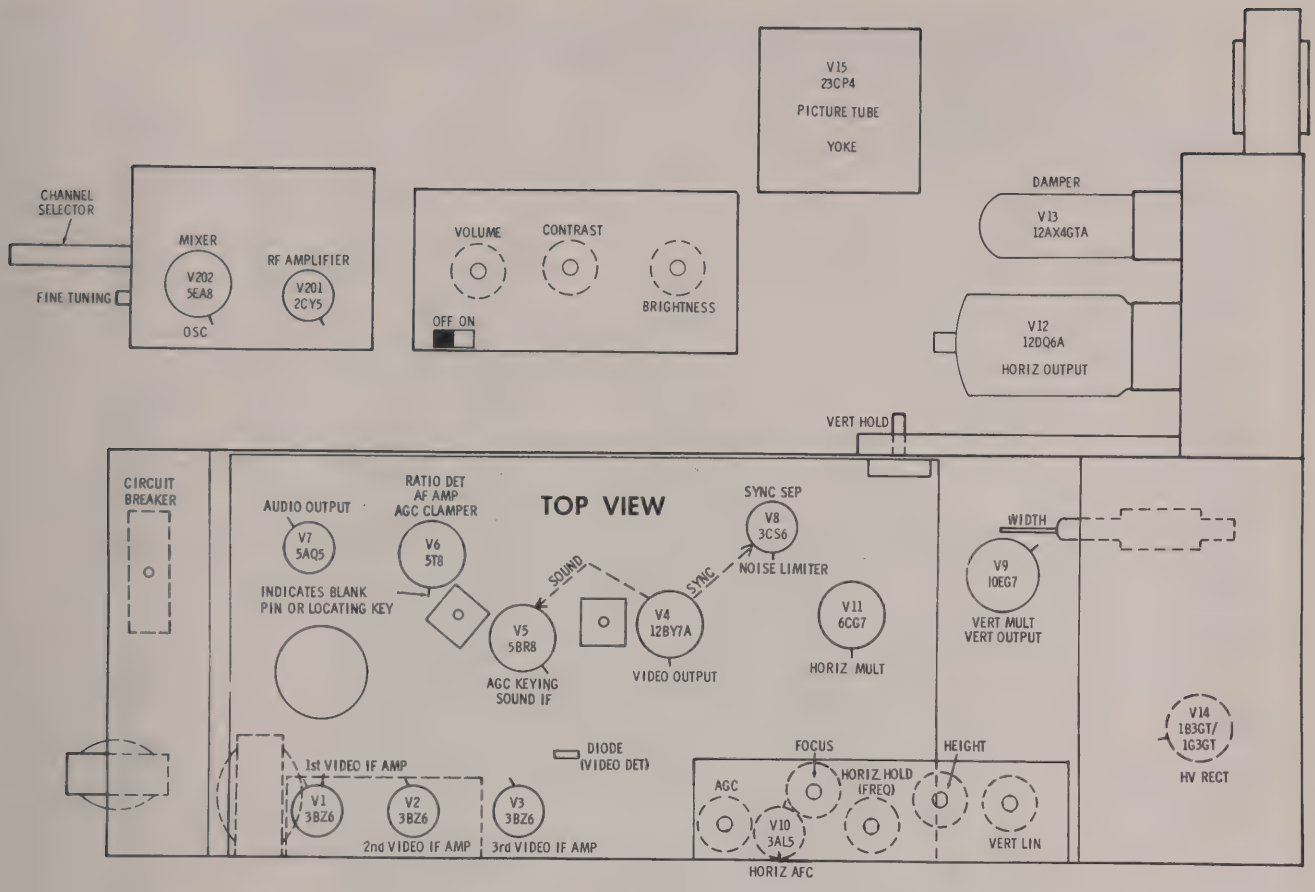
SYLVANIA MODELS 23C17, 18, 19, 20, 21, 23T12, 13, 14 (Ch. 1-544-1, -2, -3)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

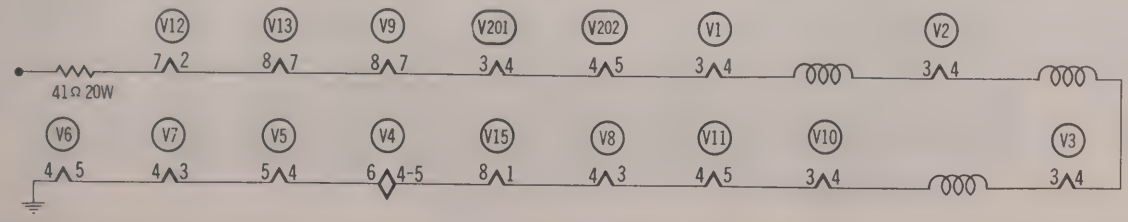
POWER SUPPLY FAILURE
No raster, no sound Circuit Breaker, Rect. (B+)

SWEEP FAILURE
No raster, has sound V11, V12, V13, V14, V15
No vertical deflection V9
Poor vert. linearity or foldover V9
Poor horiz. linearity or foldover V11, V12, V13
Narrow picture V11, V12, V13, Rect. (B+)
Vert. off freq. V9
Horiz. off freq. V10, V11

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det), V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V15
Has pic, no sound V5, V6, V7
Overloaded picture V5

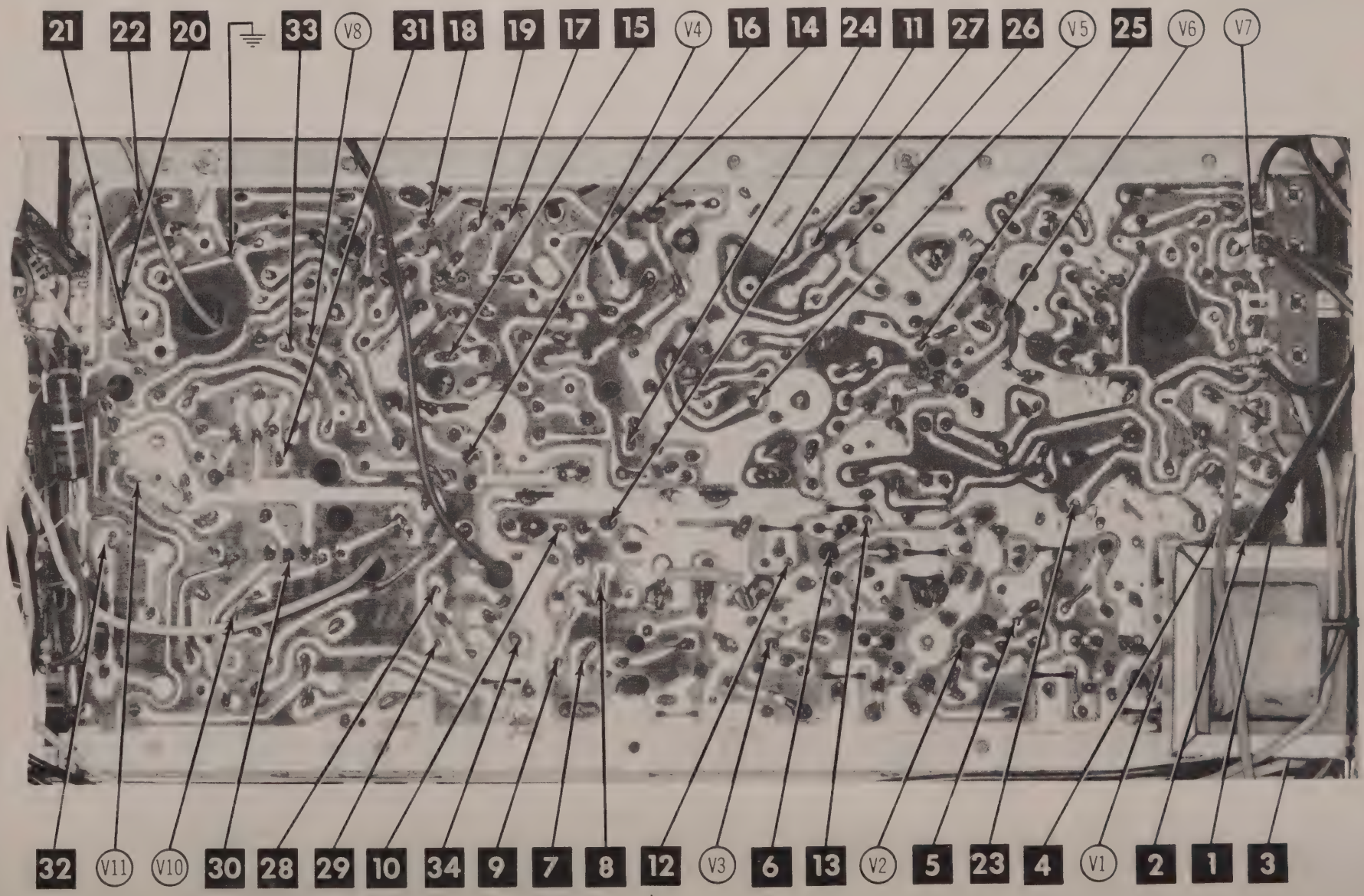
SYNC FAILURE
No vert. sync V8
No horiz. sync V8
No vert. or horiz. sync V8

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



SYLVANIA MODELS 23C17, 18, 19, 20, 21, 23T12, 13, 14 (Ch. 1-544-1, -2, -3)

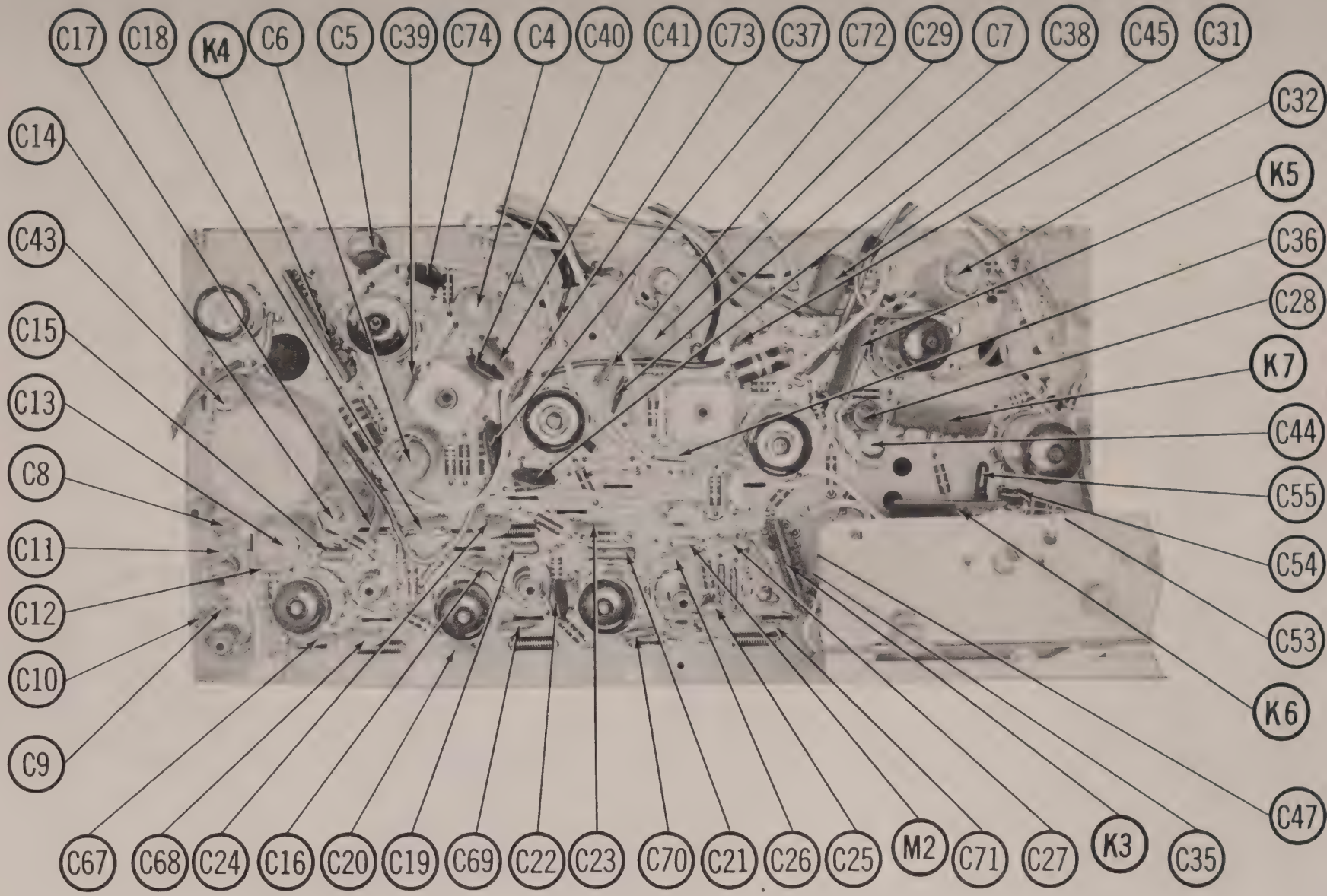
FOLDER 2



A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



PRINTED BOARD - CAPACITOR & MISC IDENT

SYLVANIA MODELS 23C17, 18, 19, 20, 21,
2312, 13, 14 (Ch. 1-544-1, -2, -3)

FOLDER 2

SET 477 FOLDER 2

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8282, 8606, 8606L, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Connect the negative lead of a 3.5 volt bias supply to point Ⓐ. Positive to chassis.
Connect the negative lead of a 25 volts bias supply to point Ⓑ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Detune Mixer Plate Coil by turning core fully counterclockwise.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	High side thru 4700mmf disc ceramic capacitor to pin 1 (grid) of 1st Video IF. Low side to chassis.	44.0MC (10MC Swp)	42.6MC 45.75MC	Any non-interfering channel	Vert. Amp. to point Ⓒ. Low side to chassis.	A1, A2, A3	Adjust for response similar to Fig. 1. A1 controls tilt, A2 controls placement of 45.75MC marker and A3 controls placement of 42.6MC marker.
2.	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	"	47.25MC	"	"	A4, A5	Detune A5, then adjust A4 for maximum dip at marker. Adjust A5 for maximum dip at marker. (See Fig. 2).
3.	"	"	41.25MC	"	"	A6	Adjust for maximum dip at 41.25MC marker.
4.	"	"	42.6MC 45.75MC	"	"	Mixer Plate Coil, & A7	Adjust for maximum gain and symmetry of response similar to Fig. 2 with markers as shown. If necessary, retouch A1 and A3 SLIGHTLY for desired response.

4.5MC TRAP ALIGNMENT

Set Contrast control fully clockwise, and Brightness control fully counterclockwise.
Connect the negative lead of a 30 volt bias supply to point Ⓐ. Positive to chassis.
Connect a 4.5MC series tuned circuit between point Ⓓ and chassis.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .001mfd to point Ⓒ. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	RF probe across coil of 4.5MC series tuned circuit	A8	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT USING ON THE AIR SIGNAL

Tune in a strong TV signal and set Contrast at maximum. Adjust the Fine Tuning until a beat pattern is visible. Adjust A8 for MINIMUM beat interference.

SOUND IF ALIGNMENT

Connect two matched 100K (±1%) resistors in series from point Ⓔ to chassis. The junction of these two resistors is alignment point Ⓖ as shown on the schematic.
Connect the negative lead of a 30 volt bias supply to point Ⓐ. Positive to chassis.
Set Contrast control fully clockwise.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	High side thru .001mfd to point Ⓒ. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe thru 100K to point Ⓔ. Common to chassis.	A9, A10	Adjust for maximum deflection.
7.	"	"	"	DC probe to point Ⓕ. Common to point Ⓖ.	All	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

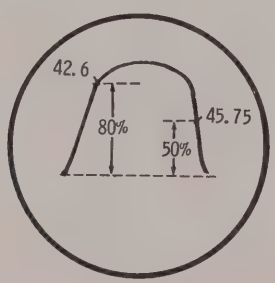


FIG. 1

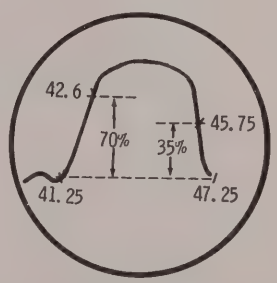
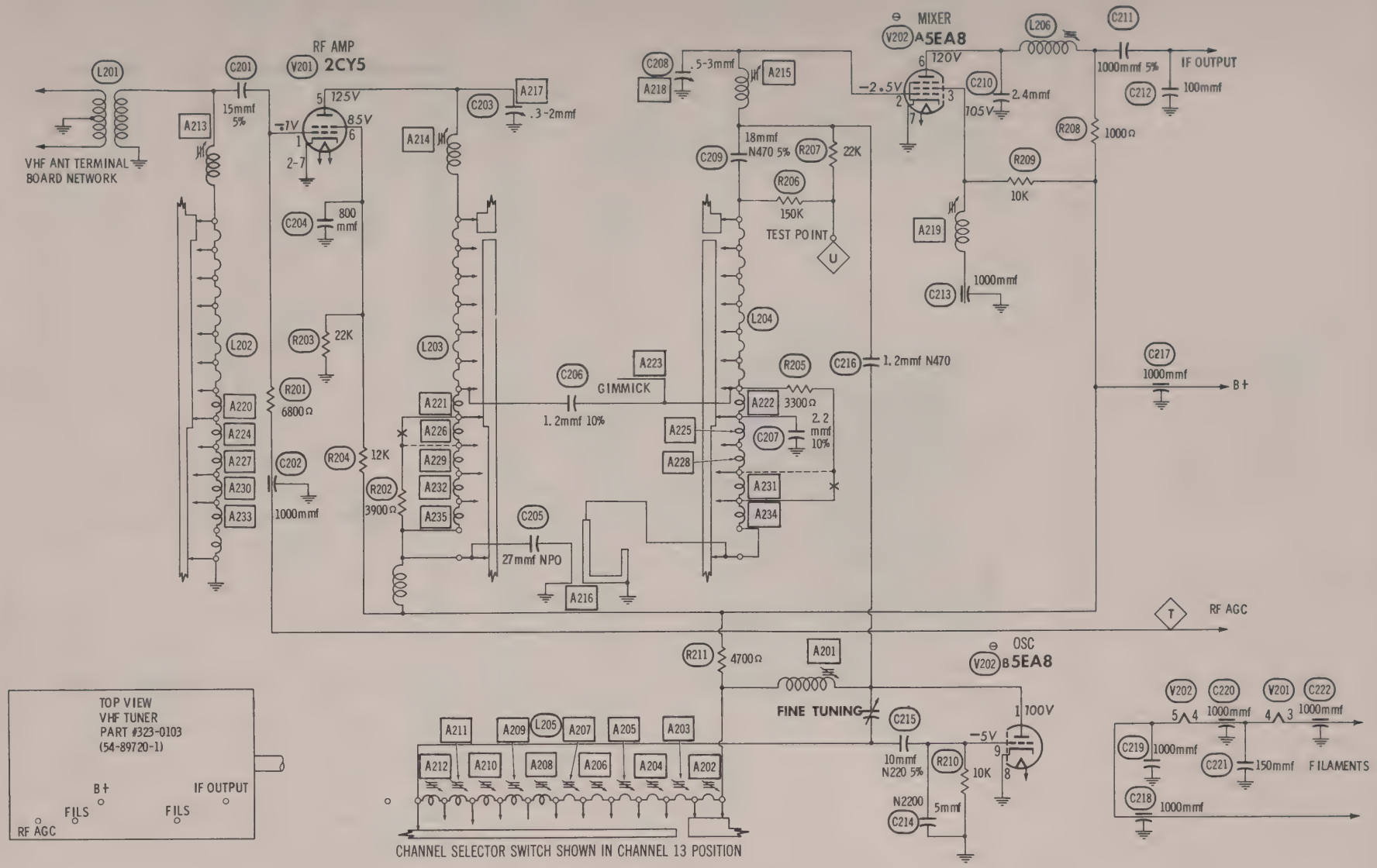


FIG. 2



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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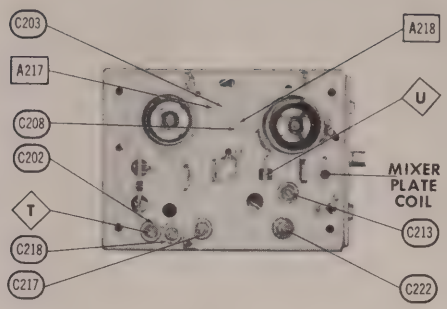
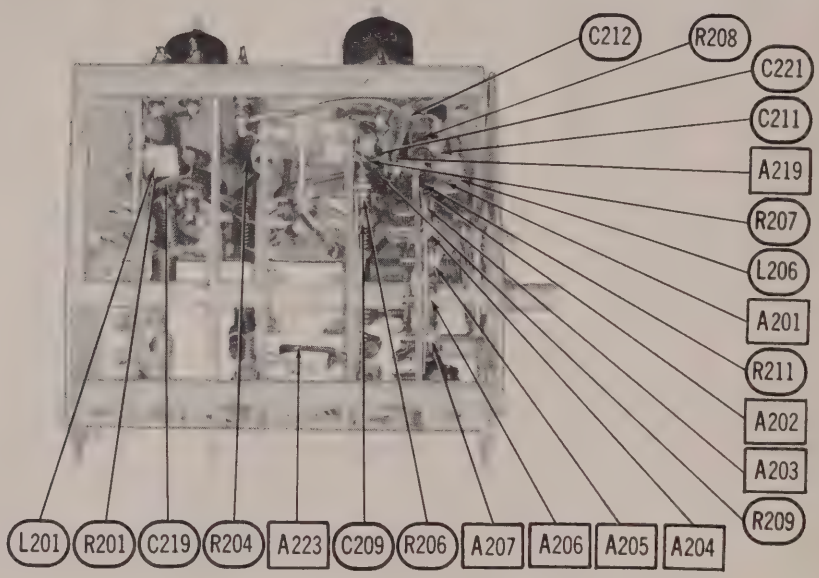
VHF TUNER 323-0103 (54-89720-1)

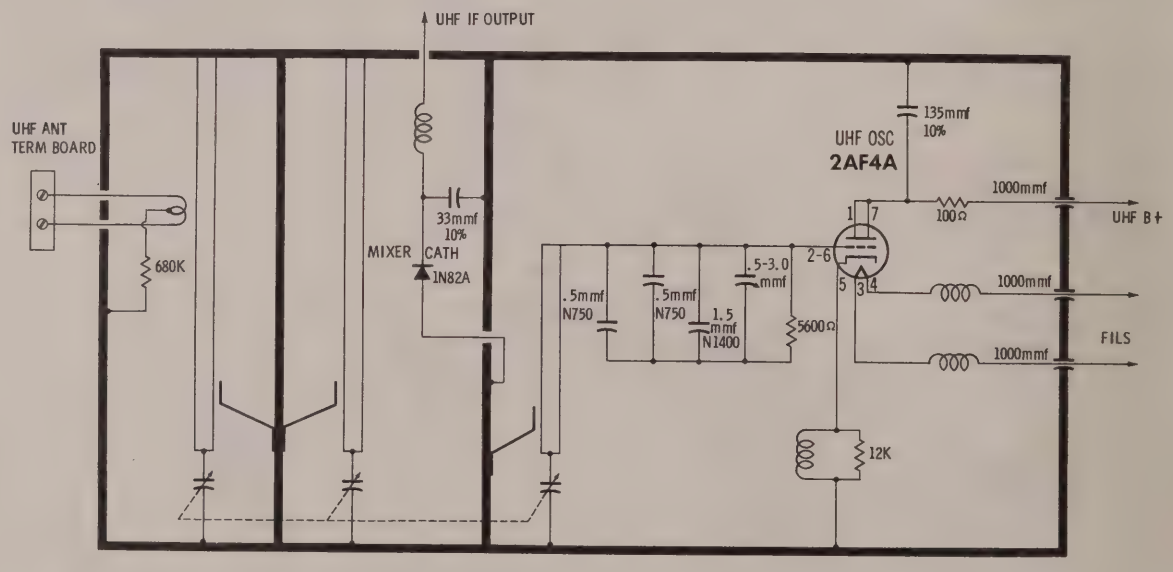
SYLVANIA MODELS 23C17, 18, 19, 20, 21, 2312, 13, 14 (Ch. 1-544-1, -2, -3)



TUNER 323-0103 (54-89720-1) - TOP VIEW



TUNER 323-0103 (54-89720-1) - LEFT SIDE



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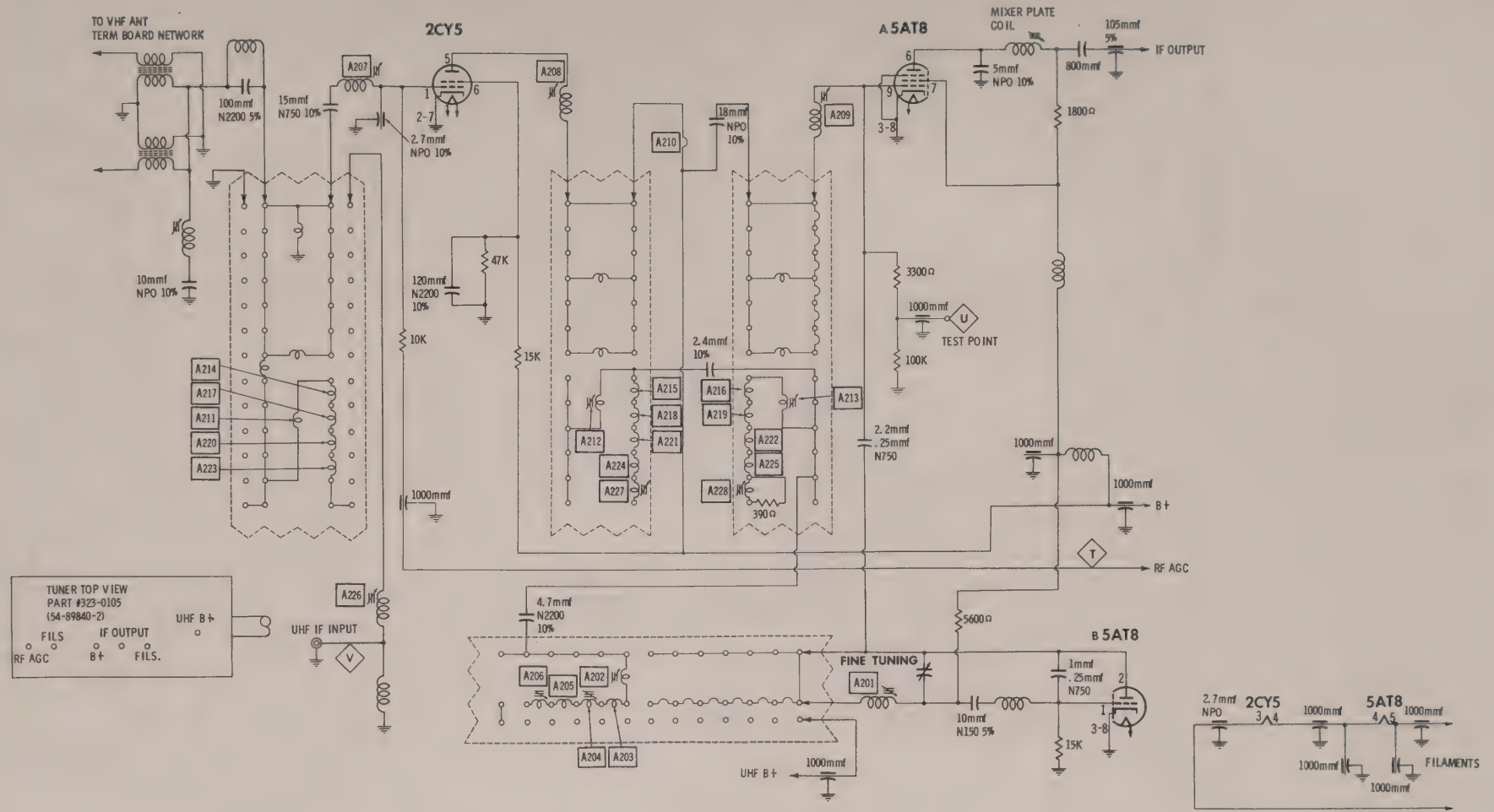
UHF TUNER 323-0104 (54-89843-1)



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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VHF TUNER with UHF Provisions 323-0105 (54-89840-2)

SYLVANIA MODELS 23C17, 18, 19, 20, 21, 23T12, 13, 14 (Ch. 1-544-1, -2, -3)

TUNER ALIGNMENT INSTRUCTIONS

323-0103(54-89720-1)
323-0106(54-88847-3)

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201 thru A212.... GENERAL CEMENT #5097, 8727
WALSCO #2515
A213 thru A215 ... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
WALSCO #2531
A217, A218 ..... GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Across VHF antenna terminals with 120Ω in each lead.	213MC	215.75MC	13	Across Video Det. load with 10K in Vert. Amp. lead.	A201	Adjust to place marker in trap notch as in Fig. 201.
		207MC	209.75MC	12		A202	
		201MC	203.75MC	11		A203	
		195MC	197.75MC	10		A204	
		189MC	191.75MC	9		A205	
		183MC	185.75MC	8		A206	
		177MC	179.75MC	7		A207	
		85MC	87.75MC	6		A208	
		79MC	81.75MC	5		A209	
		69MC	71.75MC	4		A210	
		63MC	65.75MC	3		A211	
		57MC	59.75MC	2		A212	

VHF RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Connect the negative lead of a 2.5 volt bias supply to point (T). Positive to chassis.
Use only enough sweep generator output to provide a usable pattern on scope.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Use 10MC sweep unless otherwise noted.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Across VHF antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point (U). Low side to chassis.	A213, A214, A215, A216	Adjust for maximum gain and symmetry of response similar to Fig. 202 with markers as shown. Adjust A213 for maximum gain, A214 and A215 for proper marker positions and A216 for proper bandwidth.
3.	"	177MC	175.25MC 179.75MC	7	"	A217, A218	Adjust for maximum gain and symmetry of response similar to Fig 202 with markers as shown. Repeat steps 2 and 3.
4.	"	"	"	"	"	A219	If dip in response curve exceeds 15%, adjust A219 but not to the extent that gain is lost.
5.	"	85MC	83.25MC 87.75MC	6	"	A220, A221, A222, A223	Adjust for maximum gain and symmetry of response similar to Fig. 202 with markers as shown. A220 is adjusted for maximum gain, A221 and A222 to position markers and A223 for proper bandwidth.
6.	"	79MC	77.25MC 81.75MC	5	"	A224, A225, A226	Adjust in numerical order for response similar to Fig. 202. First adjustment is for maximum gain and other two for correct marker placement.
7.	"	69MC	67.25MC 71.75MC	4	"	A227, A228, A229	"
8.	"	63MC	61.25MC 65.75MC	3	"	A230, A231, A232	"
9.	"	57MC	55.25MC 59.75MC	2	"	A233, A234, A235	"

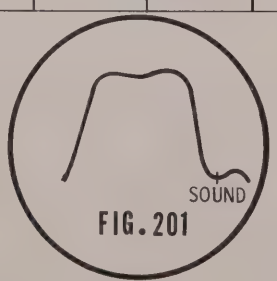


FIG. 201

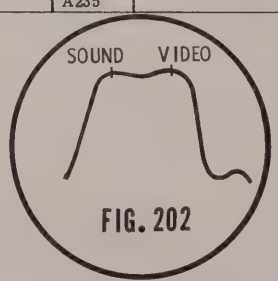


FIG. 202

TUNER PARTS LIST AND DESCRIPTIONS

323-0103(54-89720-1)

TUBES

• CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amp.	2CY5	V202	Mixer-Osc.	5EA8 (5U8) *

* Alternate

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	15 5%			DTZ-15	C10Q15C		CNO-415	10TCC-Q15
C202	1000		EF-001	MFT-1000		CCF-102	CT280A	
C203	.3-2	#172-0045						
C204	800		BPD-0008	DD-821	L10T8	CCD-821	GP382	10TS-T80
C205	27 NPO		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27
C206	1.2 10%		NPO-SI 1.5	TCZ-1R5	C10V15C		CNO-515	10TCC-V12
C207	2.2 10%		NPO-SI 2.2	TCZ-2R2	C10V22C	CCTO-2R5	CNO-522	10TCC-V22
C208	.5-3			829-3		CV-1	CT565	
C209	18 N470 5%	#166-0018N				*		
C210	2.4		NPO-DI 2.2	TCZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C211	1000 5%		ADM-19-102		1R5D1	CM-19B-102J	MCJ255	MS-21
C212	100		NPO-DI 100	DTZ-100	L10T1	CCD-101	GP310	10TS-T10
C213	1000		EF-001	MFT-1000		CCF-102	CT280A	
C214	5 N2200	#168-0029				*		
C215	10 N220 5%	#168-0061				*		
C216	1.2 N470	#168-0030				*		
C217	1000		EF-001	MFT-1000		CCF-102	CT280A	
C218	1000		EF-001	MFT-1000		CCF-102	CT280A	
C219	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	10TS-D10
C220	1000		EF-001	MFT-1000		CCF-102	CT280A	
C221	150		DI-150	DD-151	L10T15	CCD-151	GP315	10TS-T15
C222	1000		EF-001	MFT-1000		CCF-102	CT280A	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
# Sylvania Part Number.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R201	6800Ω	
R202	3900Ω	
R203	22K	
R204	12K	

ITEM No.	RATING	REMARKS
R205	3300Ω	
R206	150K	
R207	22K	
R208	1000Ω	

ITEM No.	RATING	REMARKS
R209	10K	
R210	10K	
R211	4700Ω	

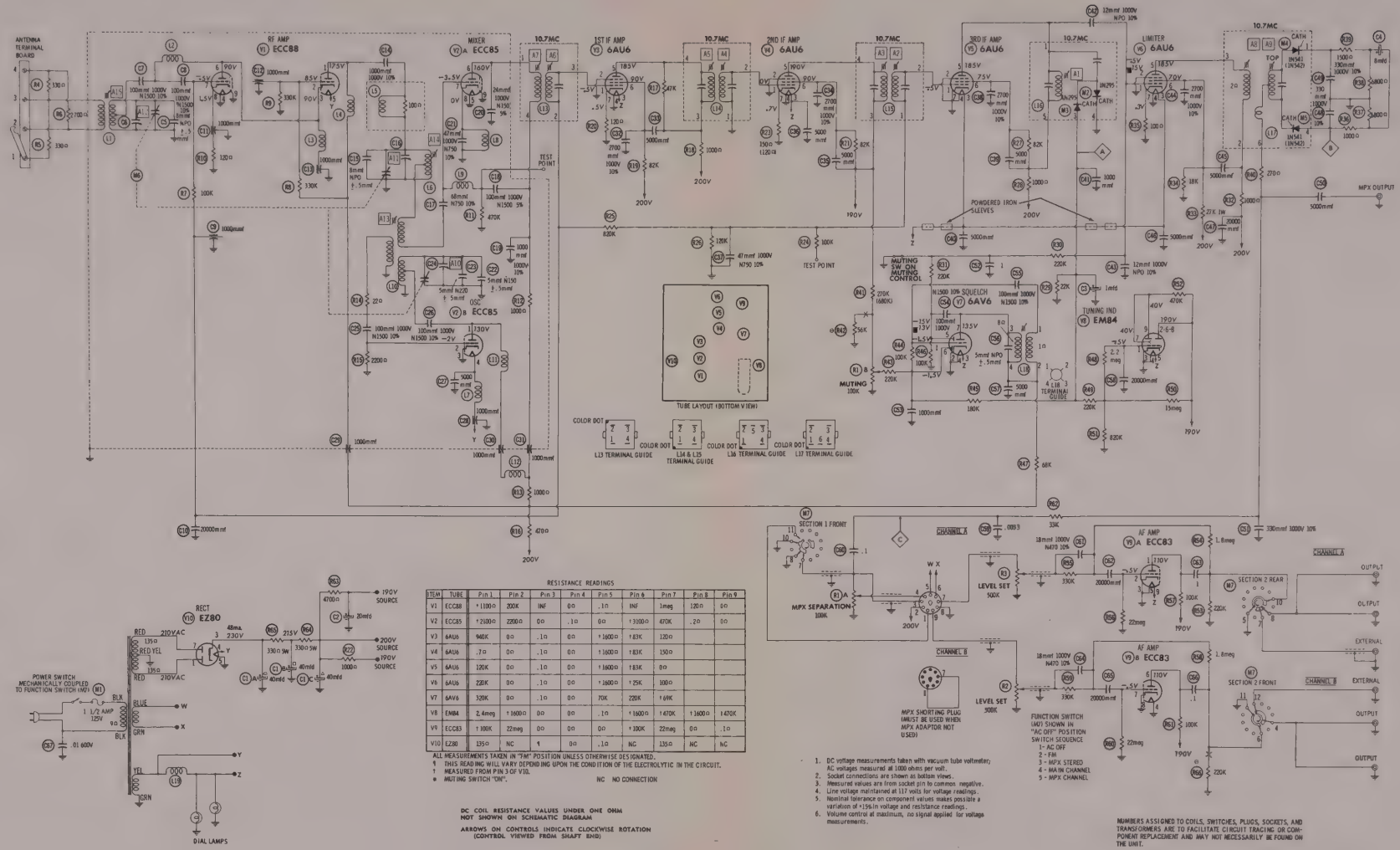
COILS (RF-IF)

ITEM No.	USE	SYLVANIA PART No.	NOTES
L201	Ant. Trans.	111-0046	
L202	Ant. Coils	570-0023	Channel 2-13, Includes Wafer Assy.
L203	RF Coils	570-0022	Channel 2-13, Includes Wafer Assy.

ITEM No.	USE	SYLVANIA PART No.	NOTES
L204	Mixer Grid Coils	570-0021	Channel 2-13, Includes Wafer Assy.
L205	Osc. Coils	570-0020	Channel 2-13, Includes Wafer Assy.
L206	Mixer Plate Coil	118-0036	

MISCELLANEOUS

ITEM No.	PART NAME	SYLVANIA PART No.	NOTES
	Screw	551-0045	Fine Tuning Adjustment
	Shaft	493-0167	Tuning (Assy.)
	Disc	338-0020	Fine Tuning



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC88	↑1100Ω	200K	INF	0Ω	.1Ω	INF	1meg	120Ω	0Ω
V2	ECC85	↑2100Ω	2200Ω	0Ω	.1Ω	0Ω	↑3100Ω	470K	.2Ω	0Ω
V3	6AU6	940K	0Ω	.1Ω	0Ω	↑1600Ω	↑83K	120Ω		
V4	6AU6	.7Ω	0Ω	.1Ω	0Ω	↑1600Ω	↑83K	150Ω		
V5	6AU6	120K	0Ω	.1Ω	0Ω	↑1600Ω	↑83K	0Ω		
V6	6AU6	220K	0Ω	.1Ω	0Ω	↑1600Ω	↑25K	100Ω		
V7	6AV6	320K	0Ω	.1Ω	0Ω	70K	220K	↑69K		
V8	EM84	2.4meg	↑1600Ω	0Ω	0Ω	.1Ω	↑1600Ω	↑470K	↑1600Ω	↑470K
V9	ECC83	↑100K	22meg	0Ω	0Ω	0Ω	↑100K	22meg	0Ω	.1Ω
V10	EZ80	135Ω	NC	¶	0Ω	.1Ω	NC	135Ω	NC	NC

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
↑ MEASURED FROM PIN 3 OF V10.
● MUTING SWITCH "ON". NC NO CONNECTION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

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FISHER
MODEL FM-100

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	SYLVANIA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T5	5600Ω	3-4Ω	143-0061 ①	24S51 ②	A-2930 ②	AU-601②	A-3877②	24S51 ②	S-3X ②	

① Models 23C18, 23C19, 23C20, 23C21 use Part #143-0071. ② Drill new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SYLVANIA PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	539-0024	4A1	Models 23T12, 23T13, 23T14
	4"	PM		539-0434		Models 23C18, 23C19, 23C20
	4"	PM		539-0430		Model 23C21
	4"	PM		539-0435		Model 23C20
	4"	PM		539-0405		Model 23C21
	4" x 8"	PM		539-4802		Model 23C20
	8"	PM	3-4Ω	539-0806	8A31	Model 23C17
	8"	PM		539-0809		Model 23C18, 23C19, 23C21

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	SYLVANIA PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.340A	517-0019 *	SD-500 ①	HA504 ①	40K ①	SR500 ①	*Dual Germanium Diode
		517-0021 †	SD-500	HA504	40K	SR500	① Silicon, 2 required.
		517-0021 †	SD-500	HA504	40K	SR500	

† Some versions use two Silicon Rectifiers.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		SYLVANIA PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N295		1N295	1N295	1N295	Video Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	SYLVANIA PART No.	NOTES
M3	Tuner	323-0106	VHF (54-88847-3)
	Tuner	323-0103	VHF (54-89720-1)
	Tuner	323-0105	VHF (54-89840-2)
	Tuner	323-0104	UHF (54-89843-1)
M4	Switch	571-0018	Off-On (SPDT Slide Type)
M5	Switch	571-0018	HaloLight (SPDT Slide Type)
M6	Circuit Breaker	191-0026	
	Tube, Halo	611-2300	Models 23T14, 23C19, 23C20, 23C21

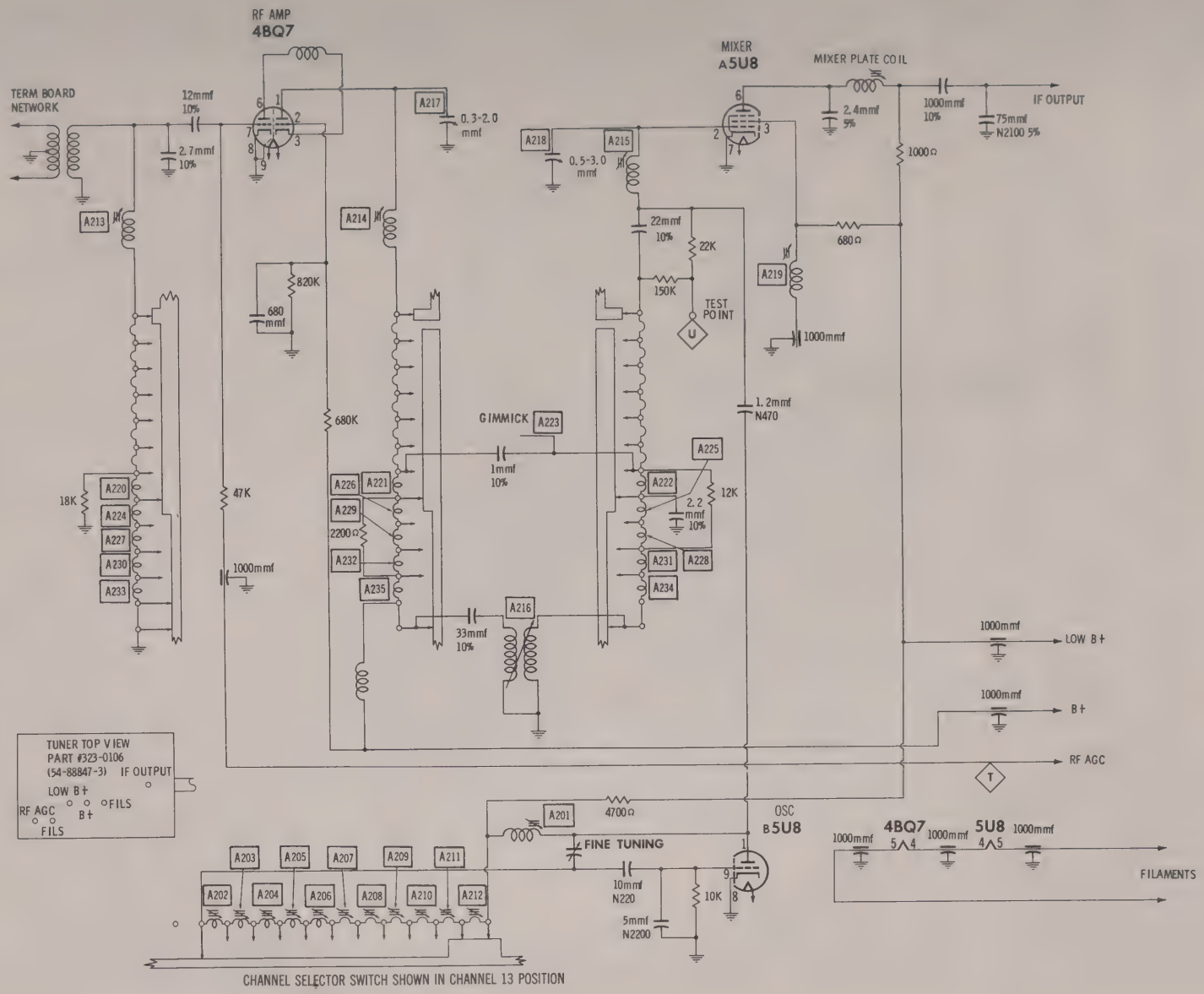
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Mask	716-0060	Picture Tube, Models 23T12, 23T13, 23C17, 23C18
Mask	716-0061	Picture Tube, Models 23T14, 23C19, 23C20, 23C21
Knob	740-0284	VHF Channel Selector, Models 23T12, 23C17
Knob	740-0279	VHF Channel Selector, Models 23T13
Knob	740-0283	VHF Channel Selector, Models 23T14, 23C18, 23C19, 23C20, 23C21
Knob	740-0282	VHF-UHF Fine Tuning
Knob	740-0278	Volume, Brightness, Contrast, Tone
Knob	740-0254	Vert. Hold
Dial	722-0073	VHF Channel Selector, VHF-UHF Models
Dial	722-0074	VHF Channel Selector, VHF Models
Dial	722-0075	UHF Channel Selector

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor)
	8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors
	8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor
	8485 (Round) - 5 Conductor
	8488 (Round) - 8 Conductor



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VHF TUNER 323-0106 (54-88847-3)

SYLVANIA MODELS 23C17, 18, 19, 20, 21, 23T12, 13, 14 (Ch. 1-544-1, -2, -3)

TUNER ALIGNMENT INSTRUCTIONS

323-0105(54-89840-2)

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Across antenna terminals with 120Ω in each lead.	213MC	215.75MC	13	Vert. Amp. thru 47K across Video Det. load.	A201	Adjust to place sound marker in trap notch as in Fig. 202.
		85MC	87.75MC	6		A202	
		79MC	81.75MC	5		A203	
		69MC	71.75MC	4		A204	
		63MC	65.75MC	3		A205	
		57MC	59.75MC	2		A206	

VHF RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Connect the negative lead of a 2.5 volt bias supply to point ⟨T⟩. Positive to chassis.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point ⟨U⟩. Low side to chassis.	A207, A208, A209, A210	Adjust for maximum gain and symmetry of response similar to Fig. 202. Adjust A207 for maximum gain, A208 and A209 for proper marker positions and adjust bandwidth by varying placement of "Gimmick" wire (A210).
3.	"	85MC	83.25MC 87.75MC	6	"	A211, A212, A213	Adjust numerically for maximum gain and symmetry of response similar to Fig. 202. First coil adjusted for maximum gain and MINIMUM tilt. Other two coils are adjusted to correctly position markers.
4.	"	79MC	77.25MC 81.75MC	5	"	A214, A215, A216	"
5.	"	69MC	67.25MC 71.75MC	4	"	A217, A218, A219	"
6.	"	63MC	61.25MC 65.75MC	3	"	A220, A221, A222	"
7.	"	57MC	55.25MC 59.75MC	2	"	A223, A224, A225	"
8.	High side thru .001mfd to point ⟨V⟩. Low side to chassis.	43MC	41.25MC 45.75MC	UHF	"	A226, A227, A228	Adjust for maximum gain and symmetry of response similar to Fig. 203 with markers as shown.

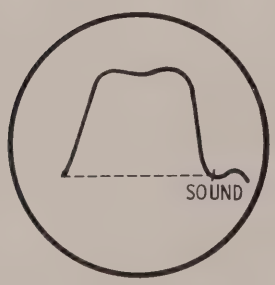


FIG. 201

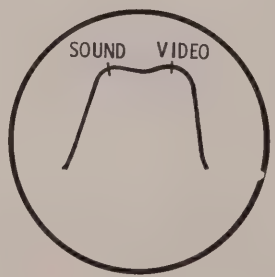


FIG. 202

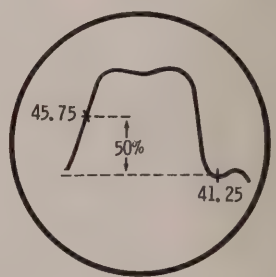
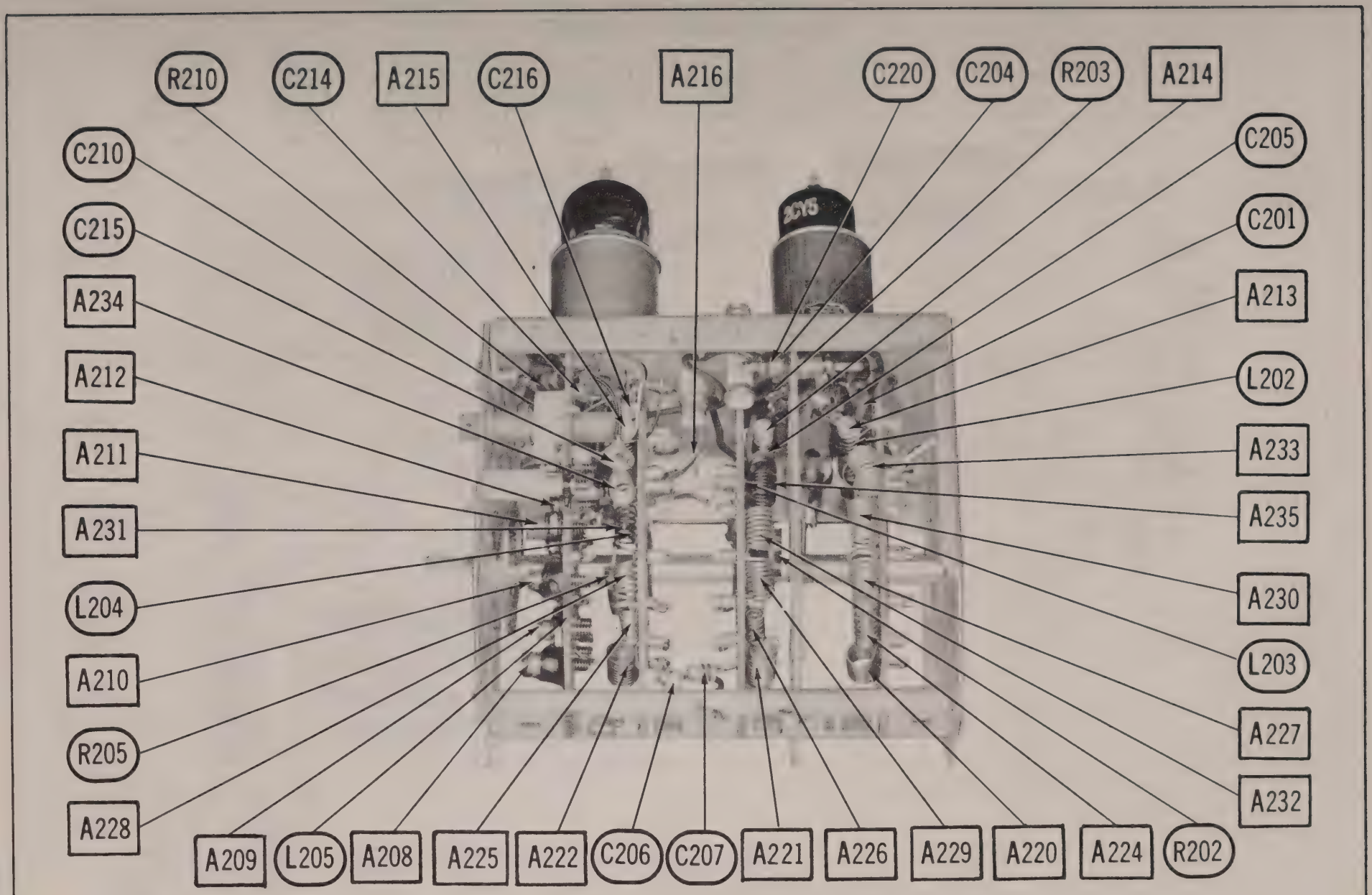


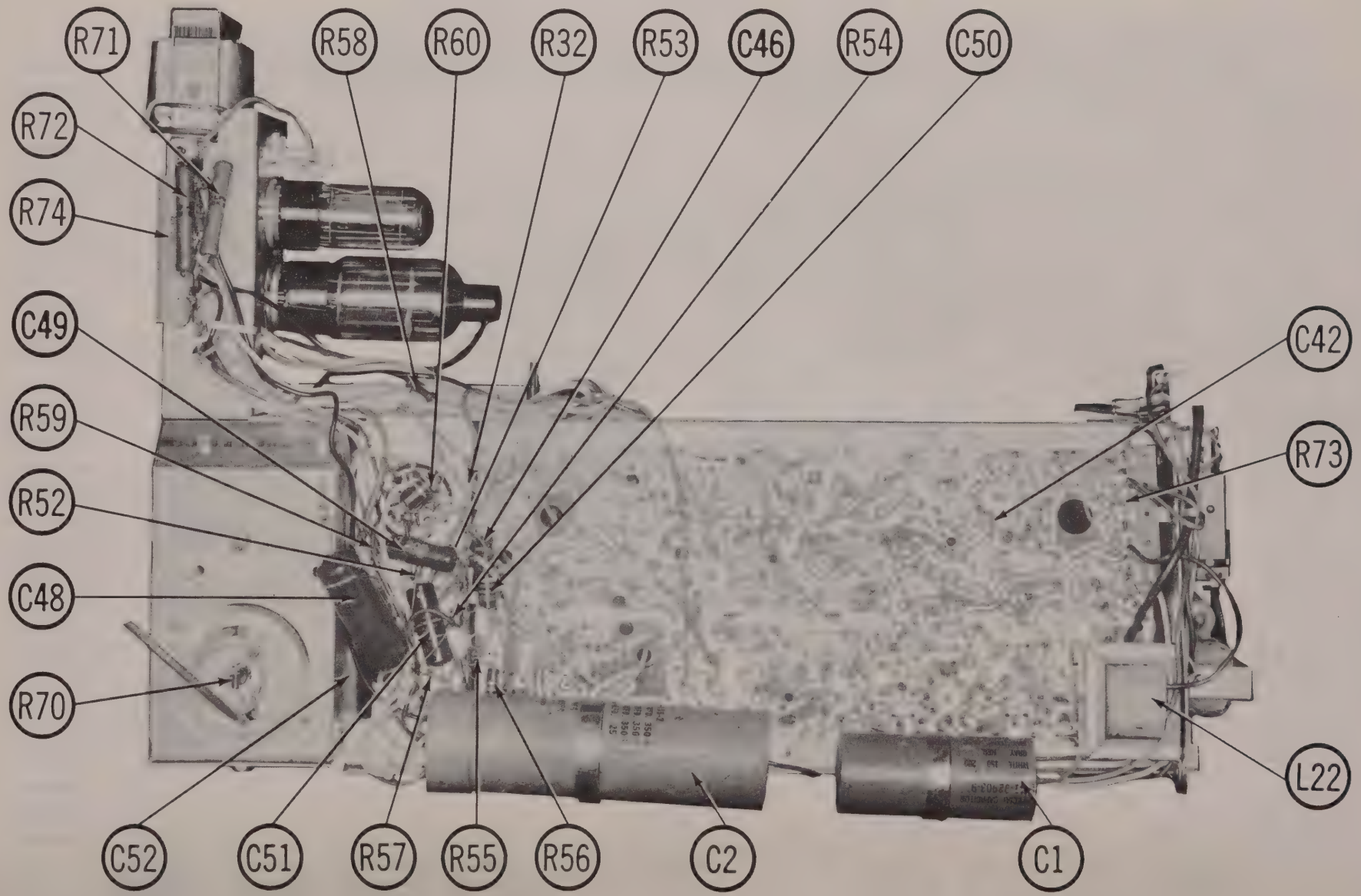
FIG. 203



TUNER 323-0103 (54-89720-1) - RIGHT SIDE

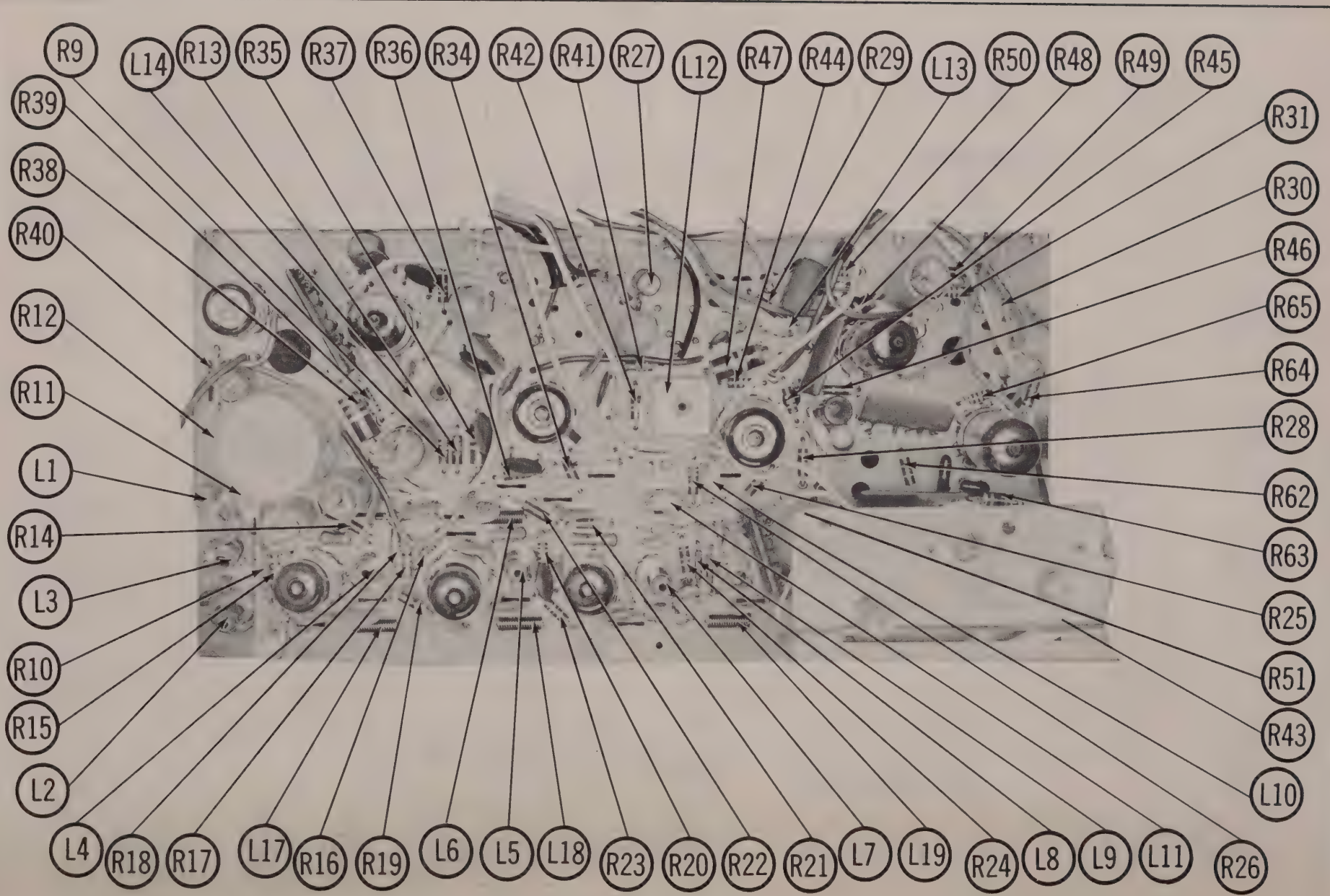
SYLVANIA MODELS 23C17, 18, 19, 20, 21,
2311, 13, 14 (Ch. 1-544-1, -2, -3)

FOLDER 2



CHASSIS - BOTTOM VIEW

CHASSIS TOP VIEW



PRINTED BOARD - RESISTOR & INDUCTOR IDENT

HORIZ OUTPUT SUB CHASSIS

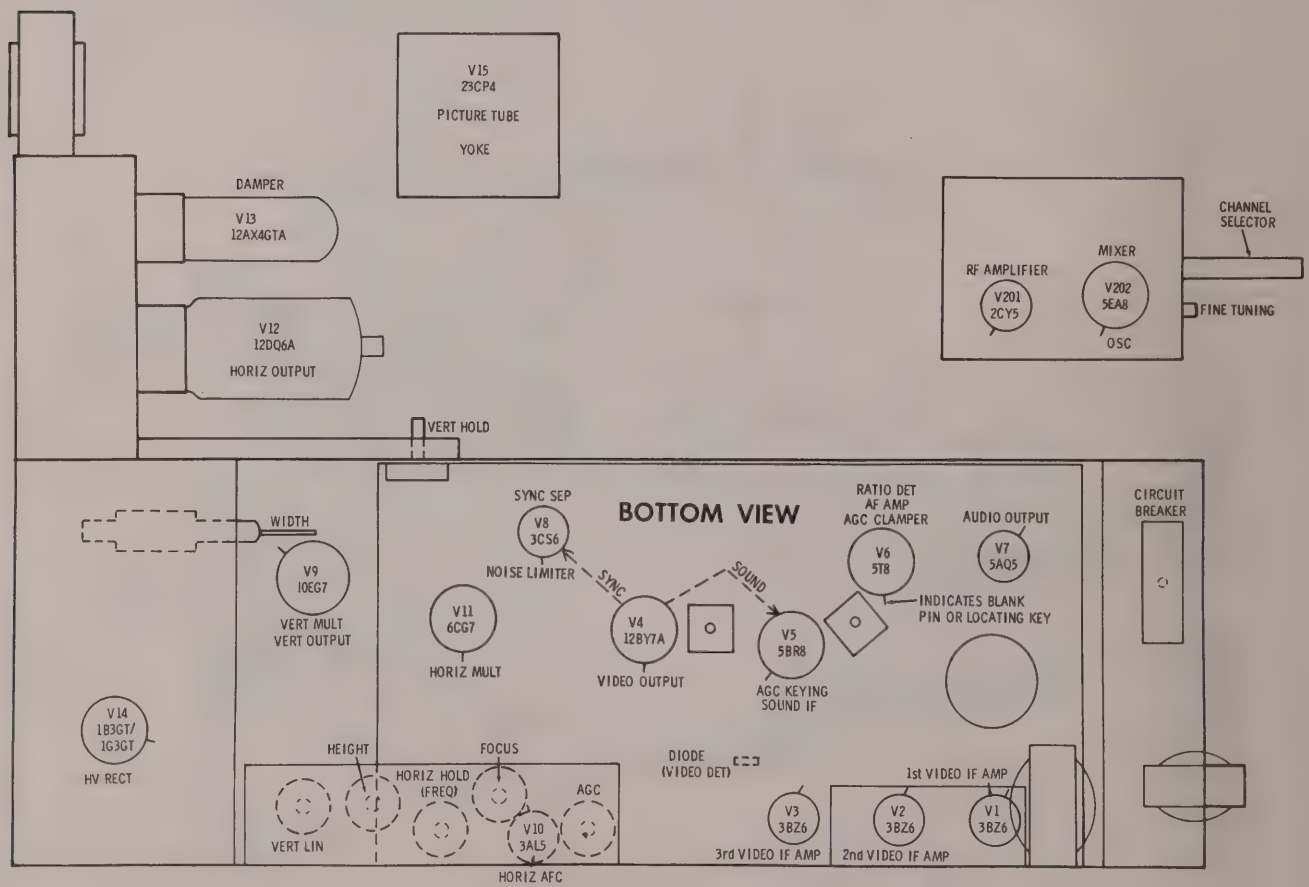
POWER SUB CHASSIS

RESISTANCE MEASUREMENTS

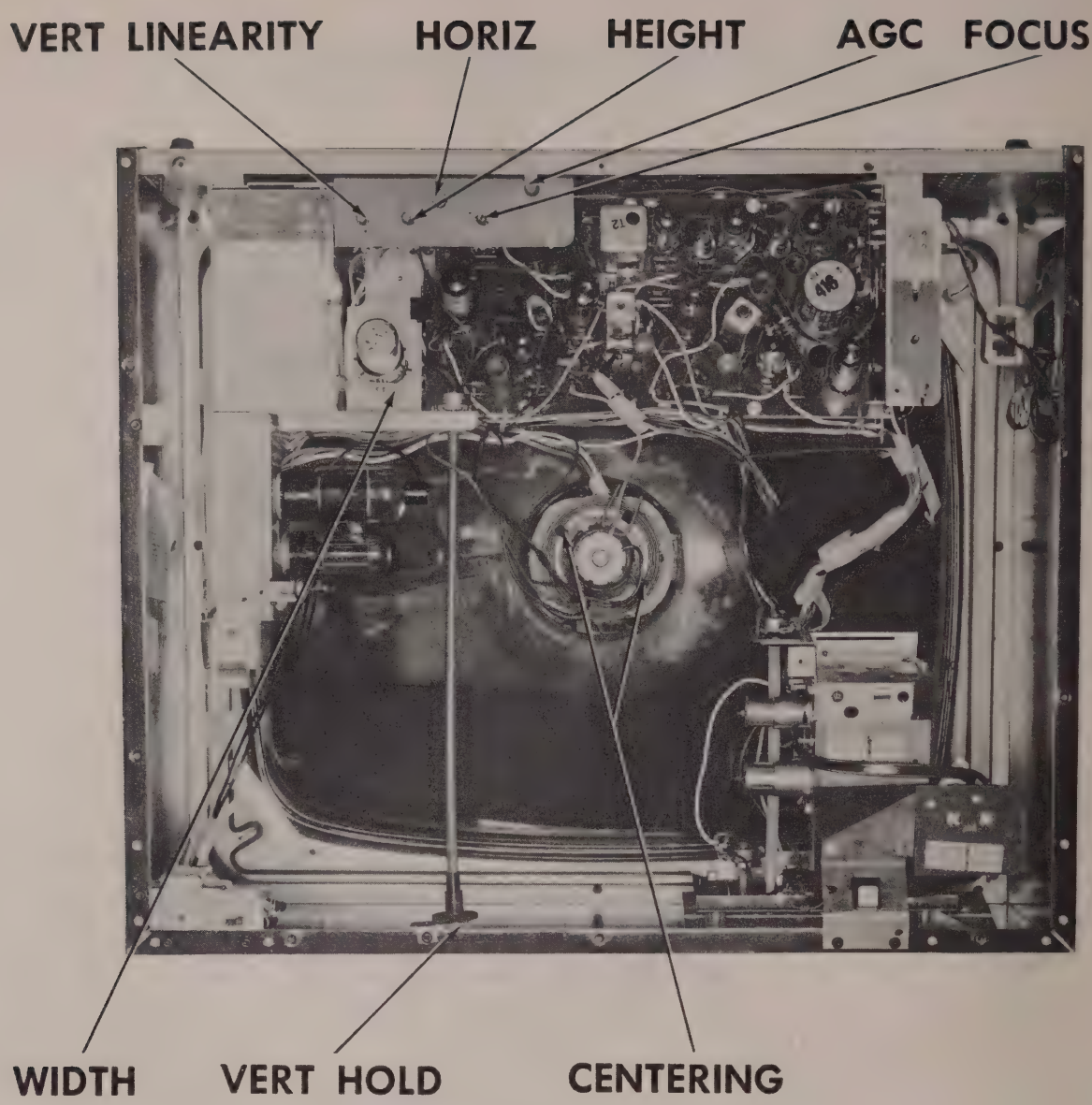
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	320K	68Ω	11Ω	10.5Ω	▲100Ω	▲100Ω	0Ω		
V2	3BZ6	30K	▲39Ω	10.5Ω	10Ω	†.2Ω	†.1Ω	INF		
V3	3BZ6	.1Ω	180Ω	10Ω	9.5Ω	†5000Ω	†5000Ω	0Ω		
V4	12BY7A	27Ω	3300Ω	0Ω	5.5Ω	5.5Ω	4.5Ω	†7000Ω	†2250Ω	0Ω
V5	5BR8	†50K	320K	● †65K	4.5Ω	3Ω	†56K	†56K	150Ω	10K
V6	5T8	INF	27K	INF	0Ω	1.5Ω	790K	0Ω	10meg	†470K
V7	5AQ5	470K	270Ω	3Ω	1.5Ω	†1200Ω	†680Ω	470K		
V8	3CS6	†1meg	0Ω	7.5Ω	7Ω	†35K	†8500Ω	1.3meg		
V9	10EG7	● 1.8meg	†160Ω	470Ω	● 3.2meg	● †3.2meg	0Ω	13Ω	16Ω	
V10	3AL5	1meg	1.8meg	9Ω	9.5Ω	1meg	NC	2700Ω		
V11	6CG7	†11K	2.8meg	1000Ω	7.5Ω	9Ω	†48K	120K	1000Ω	
V12	12DQ6A	NC	19Ω	NC	†15K	750K	TP	23Ω	0Ω	TOP CAP †11Ω
V13	12AX4GTA	NC	TP	¶1.5meg	NC	†48Ω	TP	16Ω	19Ω	
V14	1B3GT/ 1G3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †275Ω
V15	23CP4	7Ω	47K	†0Ω	● †1.8meg	NC	NC	●450K	5.5Ω	
V201	2CY5	800K	0Ω	13Ω	12.5Ω	†2250Ω	†11K	0Ω		
V202	5EA8	†6900Ω	170K	†12K	12.5Ω	11Ω	†3200Ω	0Ω	0Ω	10K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 250V SOURCE.
▲ MEASURED FROM PIN 7 OF V2.
‡ MEASURED FROM PIN 3 OF V13.

NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the Brightness and Contrast controls for a normal picture.

Turn the Horizontal Hold clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.

Turn the Horizontal Hold slowly counterclockwise until the picture just falls into sync.

Adjust the Width slug (B1) for a picture SLIGHTLY wider than necessary to fill the picture mask horizontally.

PHOTOFACT® Folder

**BELL SOUND
MODEL 3070**

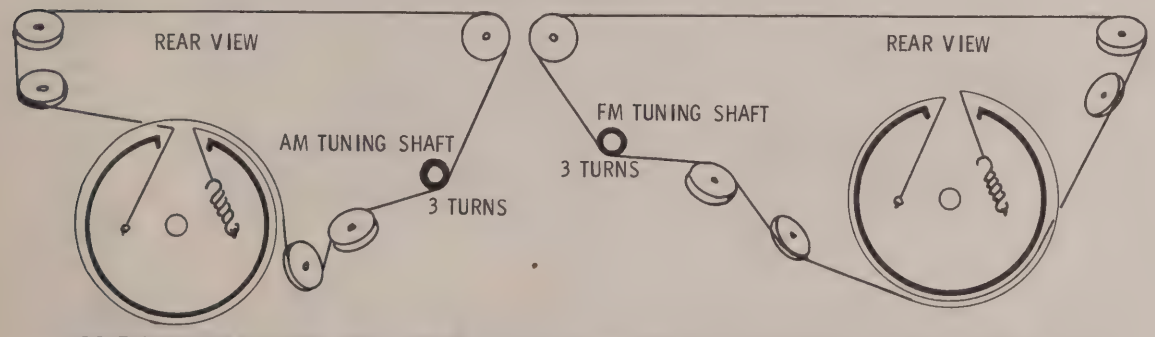
BELL SOUND
MODEL 3070

BELL SOUND
MODEL 3070

TRADE NAME	Bell Sound Model 3070		
MANUFACTURER	Bell Sound Div., Thompson Ramo Wooldridge Inc., 555 Marion Road, Columbus 7, Ohio		
TYPE SET	AC Operated 12 Tube FM-AM Tuner		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	45 Watts, .45 Amp. @117 Volts AC (AM)
TUNING RANGE—BROADCAST	535-1620KC	FREQ. MOD.	88—108MC

DIAL CORD STRINGING

BOTH TUNING GANGS FULLY CLOSED



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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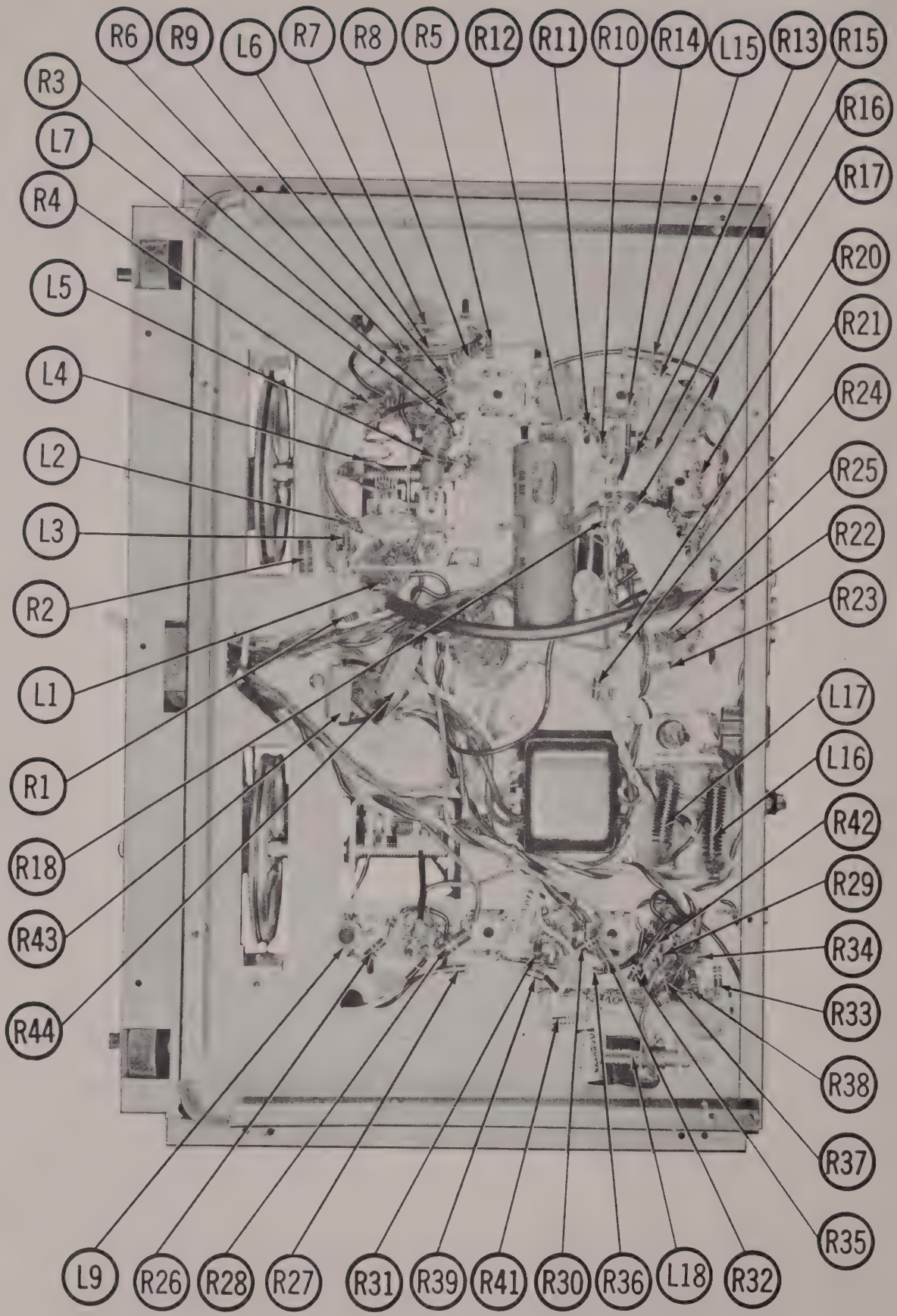
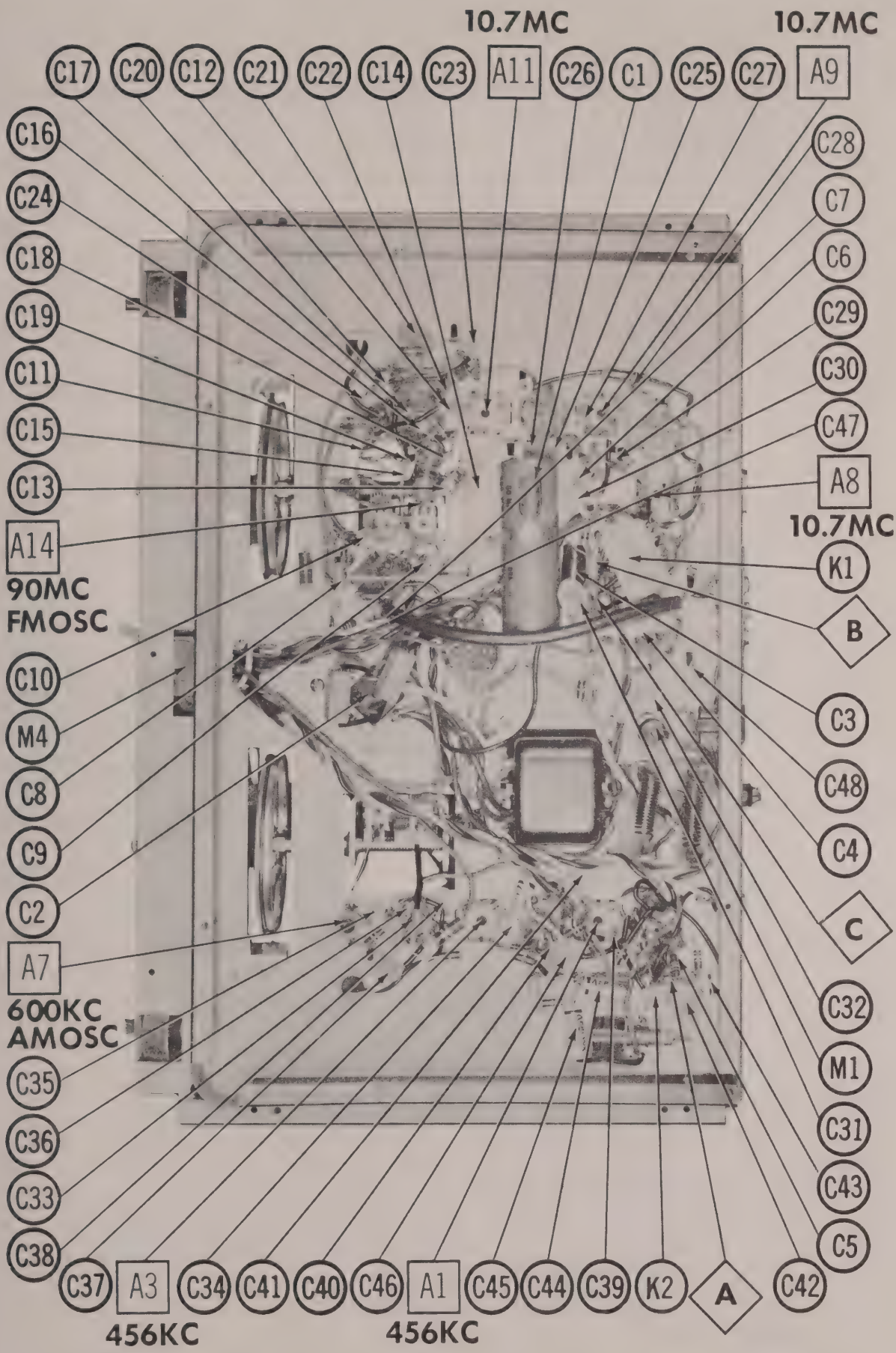
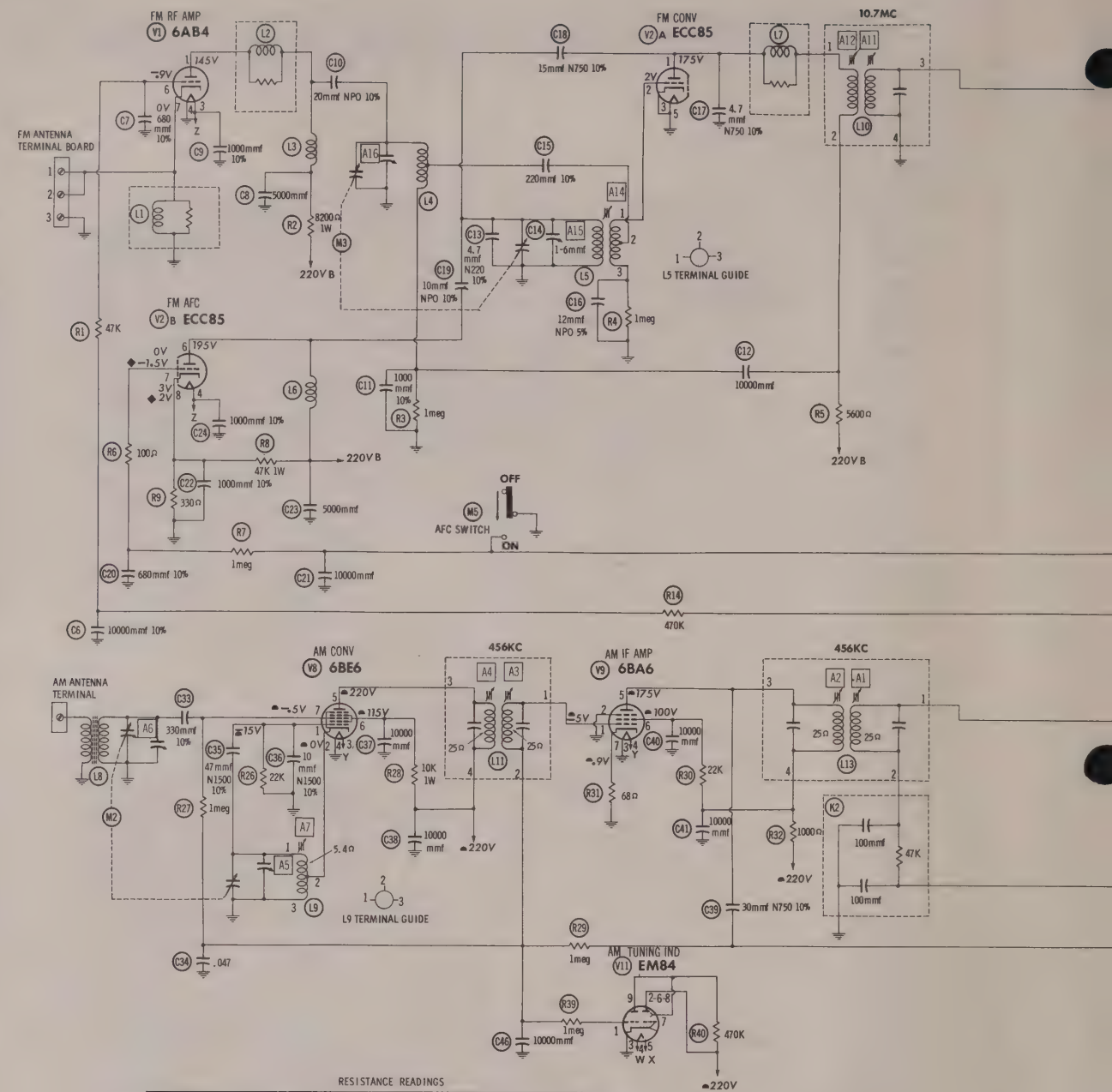
JL537



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



CHASSIS BOTTOM VIEW - ALIGNMENT, CAPACITOR & MISC. IDENT.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AB4	†9200Ω	TP	.1Ω	0Ω	TP	620K	.1Ω		
V2	ECC85 6AQ8	†6600Ω	1meg	0Ω	.1Ω	0Ω	†1000Ω	INF ▪ 1meg	330Ω	0Ω
V3	6AU6	.1Ω	0Ω	.1Ω	0Ω	†2000Ω	†28K	68Ω		
V4	6AU6	100K	0Ω	.1Ω	0Ω	†35K	†35K	0Ω		
V5	6AL5	7800Ω	8300Ω	.1Ω	.1Ω	INF ▪ 1meg	0Ω	INF ▪ 1meg		
V6	EM84 6FG6	1meg	†1000Ω	0Ω	.1Ω	.1Ω	†1000Ω	†470K	†1000Ω	†470K
V7	6AV6	56K	1800Ω	.1Ω	.1Ω	0Ω	0Ω	†100K		
V8	6BE6	▪22K	.8Ω	.1Ω	0Ω	†▪1000Ω	†▪11K	3meg		
V9	6BA6	▪2meg	0Ω	0Ω	.1Ω	†▪2000Ω	†▪23K	68Ω		
V10	6AV6	22K	1800Ω	.1Ω	.1Ω	1meg	320K	†▪100K		
V11	EM84 6FG6	3meg	†▪1000Ω	0Ω	.1Ω	.1Ω	†▪1000Ω	†▪470K	†1000Ω	† 470K
V12	EZ80 6V4	250Ω	NC	¶	.1Ω	0Ω	NC	240Ω	NC	NC

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V12.
▪ MEASURED IN "AM" POSITION.
▪ TAKEN WITH AFC SWITCH IN "ON" POSITION.
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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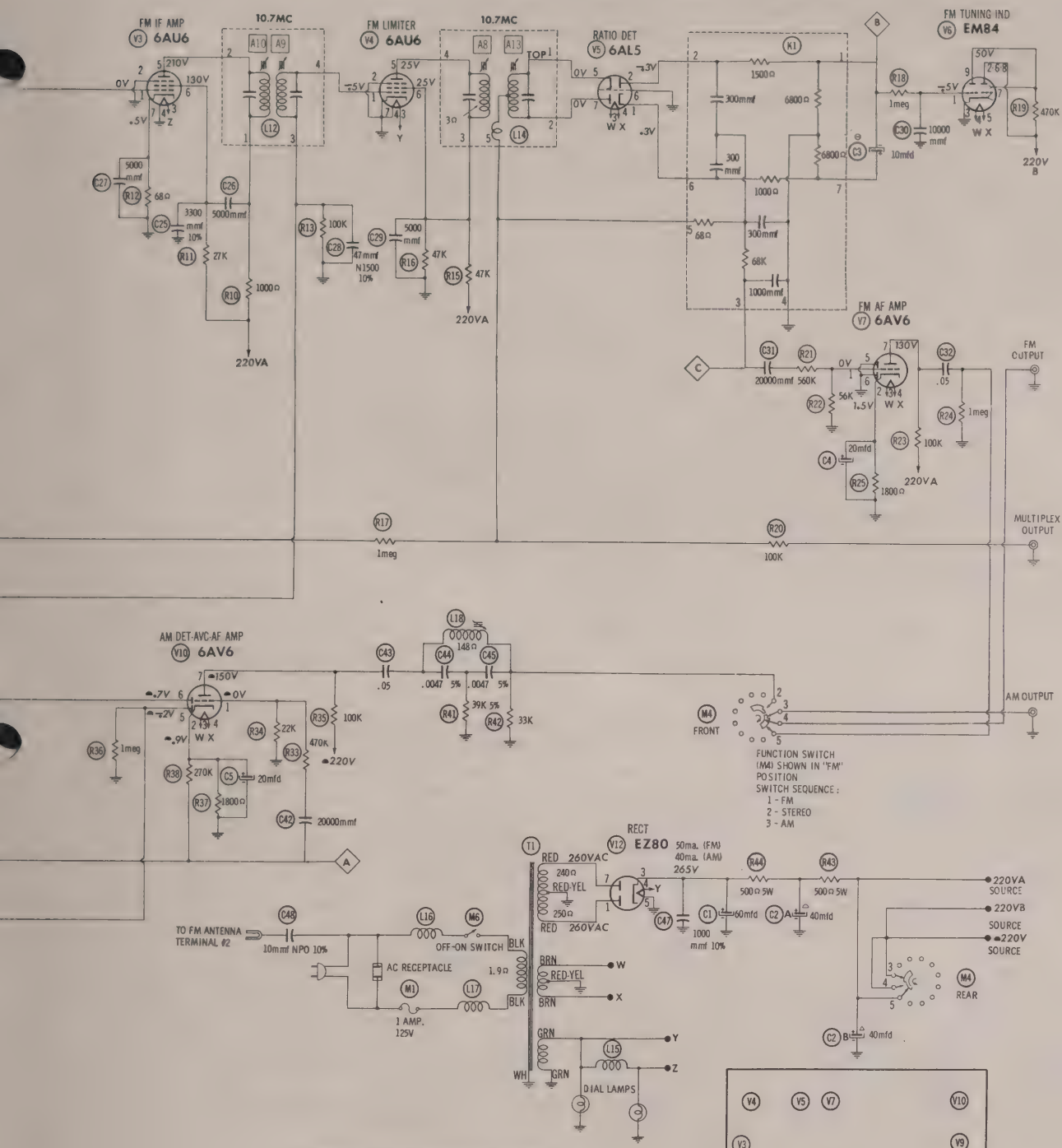


1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. no signal applied for voltage measurements.

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

BELL SOUND MODEL 3070

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:

A1 thru A4, A8 thru A13.....	GENERAL CEMENT #5097, 8727 WALSCO #2515
A5, A6, A15, A16.....	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A7.....	GENERAL CEMENT #8721, 8722 WALSCO #2519
A14.....	GENERAL CEMENT #8606, 8606L, 8282, 9295 WALSCO #2526, 2543, 2544, 2545

AM ALIGNMENT — SELECTOR SWITCH IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .01mfd to pin 7 (grid) of Converter. Low side to chassis.	456KC (Unmod.)	AM.Tuning gang fully open.	DC probe thru 100K to point Ⓐ. Common to chassis.	A1, A2, A3, A4,	Adjust for maximum deflection.
2.	High side thru 200mmf to AM antenna terminal. Low side to chassis.	1400KC	1400KC	"	A5, A6	"
3.	"	600KC	Tune to 600KC Signal.	"	A7	Adjust for maximum deflection while rocking tuning gang. Repeat Steps 2 and 3.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM—SELECTOR SWITCH TO FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	High side thru 10mmf to FM RF stator lug of tuning gang. Low side to chassis.	10.7MC (Unmod.)	FM-AFC Off. Point of non-interference.	DC probe thru 100K to point Ⓑ. Common to chassis.	A8, A9, A10, A11, A12	Adjust for maximum deflection.
5.	"	"	"	DC probe to point Ⓒ. Common to chassis.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE — SELECTOR SWITCH TO FM POSITION

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	High side thru 10mmf to FM RF stator lug of tuning gang. Low side to chassis.	10.7MC (450 KC Swp)	FM-AFC Off. Point of non-interference.	Vert. amp. thru 100K to point Ⓑ. Low side to chassis.	A8, A9, A10, A11, A12	Disconnect Stabilizing capacitor C3. Adjust for maximum gain and symmetry of response similar to Fig. 1. Reconnect C3.
5.	"	"	"	Vert. amp. to point Ⓒ. Low side to chassis.	A13	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

FM —RF ALIGNMENT — SELECTOR SWITCH IN FM POSITION

Coils not containing adjustable cores are adjusted by expanding or compressing coil turns. Alignment must be made so that calibration is correct with bottom plate installed.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	Across FM Antenna terminals with 270Ω in high side.	90MC (Unmod.)	FM-AFC Off. 90MC	DC probe thru 100K to point Ⓑ. Common to chassis.	A14	Adjust for maximum deflection.
7.	"	106MC	106MC	"	A15, A16	Adjust for maximum deflection.
8.	"	90MC	90MC	"	L5	Adjust for maximum deflection. Check calibration and if necessary, retouch A14 and A15.

FIG. 1

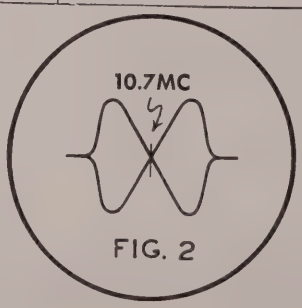


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE
V1	FM RF Amplifier	6AB4
V2	FM Converter-AFC	ECC85/6AQ8
V3	FM IF Amplifier	6AU6
V4	FM Limiter	6AU6
V5	Ratio Detector	6AL5
V6	FM Tuning Indicator	EM84/6FG6
V7	FM AF Amplifier	6AV6
V8	AM Converter	6BE6
V9	AM IF Amplifier	6BA6
V10	AM Det-AVC-AF Amp.	6AV6
V11	AM Tuning Indicator	EM84/6FG6
V12	Rectifier	EZ80/6V4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Bell Sound PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	60	300	23B50	PRS1690	BR6035	TC68	TD-60-350	TVA-1613	
C2A	▲40	300	23B49	AFH2-33	B0260	FP217.87	TMD-31	TVL-2575	
B	▲40	300							
C3	10	50	23B45 *	SRE50V10	NLW10-50	TT50X10	ML10-50	TE-1304	
C4	20	6	23B6	XPP-6020	NLW20-6	TT15X20	ML20-6	TE-1090	
C5	20	6	23B8	XPP-6020	NLW20-6	TT15X20	ML20-6	TE-1090	

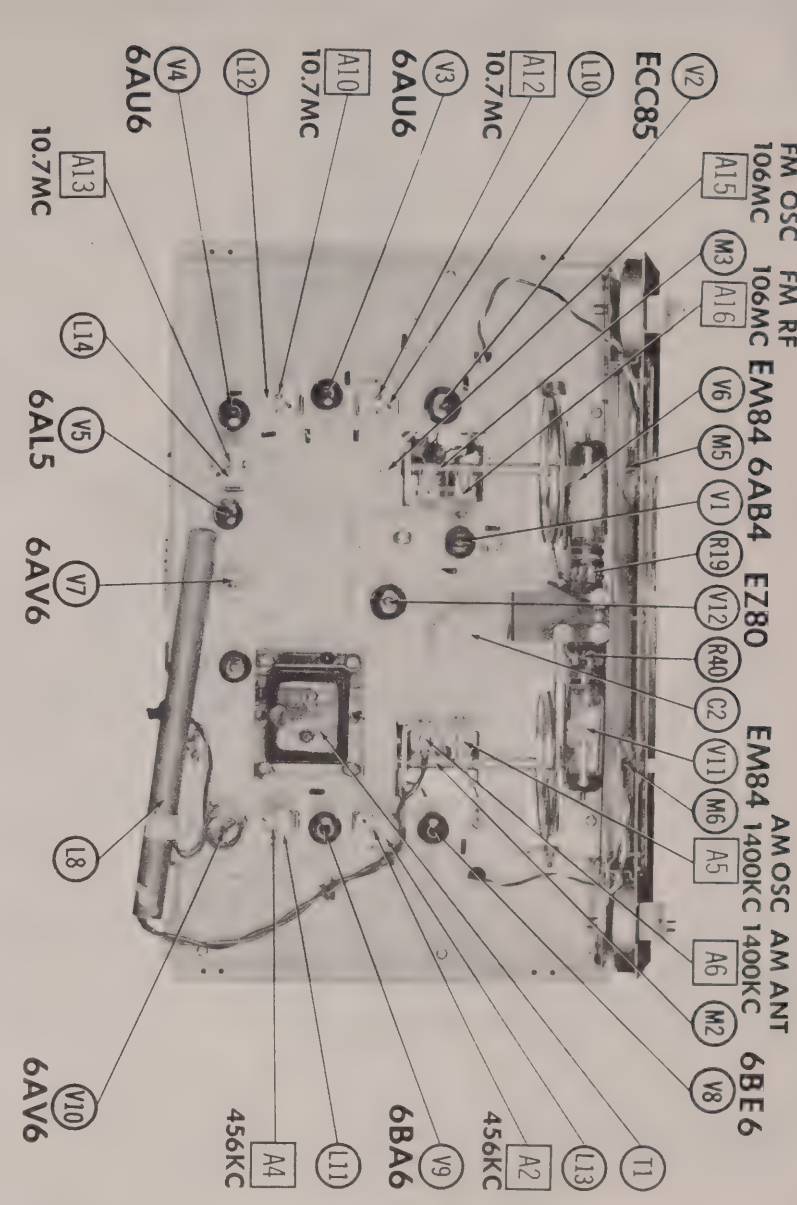
* Alternate Part #23A45.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C7	680 10%		DI-680	DD-681	1R5T68	CCD-681	GP368	10TS-T68
C8	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C9	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C10	20 NPO 10%		NPO-DI 20	DTZ-20	C10Q2C	CCTO-200	CNO-410	10TCC-Q20
C11	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C12	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C13	4.7 N220 10%	#24A93				*		10TCR-V47
C14	1-6	#25A8				VC-3	CT552	
C15	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C16	12 NPO 5%			TCZ-12	C10Q12C		CNO-412	10TCC-Q12
C17	4.7 N750 10%			DTN-5	C10V5U	CCTN-050	CN7-547	10TCU-V47
C18	15 N750 10%		N750-DI 15	DTN-15	C10Q15U	CCTN-150	CN7-415	10TCU-Q15
C19	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C20	680 10%		DI-680	DD-680	1R5T68	CCD-681	GP368	10TS-T68
C21	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C22	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C23	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C24	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C25	3300 10%		DI-3300		PM6D33	CCD-332	JL-233	10TS-D33
C26	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C27	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C28	47 N1500 10%	#24A87		TCL-47		*		
C29	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C30	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C31	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C32	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C33	330 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C34	.047 50V		P288N-047	DD-503	STM1S47	1DP-2-473	GEM-4147	2TM-S5
C35	47 N1500 10%	#24A87		TCL-47		*		
C36	10 N1500 10%	#24A86		TCL-10		*		
C37	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C38	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C39	30 N750 10%		N750-DI 33	TCN-30	C10Q3U	CCTN-330	CN7-433	10TCU-Q33
C40	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C41	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C42	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C43	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C44	.0047 200V 5%		V84C2D47-5%		1R5D47	CM-20B-472J	MCJ467	5BF-D47

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C45	.0047 200V 5%		V84C2D47-5%		1R5D47	CM-20B-472J	MCJ467	5BF-D47
C46	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C47	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C48	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10

Bell Sound Part Number.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R1	47K	
R2	8200Ω 1W	
R3	1meg	
R4	1meg	
R5	5600Ω	
R6	100Ω	
R7	1meg	
R8	47K 1W	
R9	330Ω	
R10	1000Ω	
R11	27K	
R12	68Ω	
R13	100K	
R14	470K	
R15	47K	

ITEM No.	RATING	REMARKS
R16	47K	
R17	1meg	
R18	1meg	
R19	470K	
R20	100K	
R21	560K	
R22	56K	
R23	100K	
R24	1meg	
R25	1800Ω	
R26	22K	
R27	1meg	
R28	10K 1W	
R29	1meg	
R30	22K	

ITEM No.	RATING	REMARKS
R31	68Ω	
R32	1000Ω	
R33	470K	
R34	22K	
R35	100K	
R36	1meg	
R37	1800Ω	
R38	270K	
R39	1meg	
R40	470K	
R41	39K 5%	
R42	33K	
R43	500Ω 5W	
R44	500Ω 5W	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Bell Sound PART No.	REPLACEMENT DATA	
K1	Ratio Detector Network	(3) 300mmf, 1000mmf, 68Ω, 1000Ω, 1500Ω, (2) 6800Ω, 68K	57A14	Aerovox	PA-694
				Centralab	PC-342
K2	AM Diode RF Filter	100mmf, 100mmf, 47K	57A2	Aerovox	PA-97
				Centralab	PC-50
				Cornell-Dubilier	111TM1
				Sprague	D-1

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		Bell Sound PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	FM Ant. Coil	31A20						
L2	RF Choke	31A31						
L3	RF Choke	31A24	19-2006	19-2006	BC-560	4590		.68uh
L4	FM RF Coil	31B28						
L5	FM Osc. Coil	31B29						
L6	RF Choke	31A22	19-1002	19-1002	BC-563	4606		2.5uh
L7	RF Choke	31A19						
L8	Loopstick	31A30						
L9	AM Osc. Coil	31A26	14-1055	14-1055	BC-393			
L10	1st FM IF	32C44	16-3487	16-3487	FM-254	1463		
L11	1st AM IF	32C67	16-6758	16-6758	BC-352	12-C1	RF-1	
L12	2nd FM IF	32C24	16-3487	16-3487	FM-254	1463		
L13	2nd AM IF	32C67	16-6758	16-6758	BC-353	12-C2	RF-2	
L14	Ratio Detector	32C66	17-3498	17-3498	FM-255	1465		
L15	Fil. Choke	31A21	19-1003	19-1003	BC-564	4608		3.8uh
L16	Line Choke	31B8						1.4uh

COILS (RF-IF) (cont)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		Bell Sound PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L17	Line Choke	31B8						1.4uh
L18	Equalizer Coil	31B9						

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	Bell Sound PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V@ .5A	520 VCT @.050A	6.3 VCT @1.6A	32B78						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V@ 2.6A									

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Bell Sound PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1A 125V S/B	53A10		312001 (1A 125V S/B)	342001	AGC 1	HKP

MISCELLANEOUS

ITEM No.	PART NAME	Bell Sound PART No.	NOTES
M2	Tuning Cap	25B11	AM, 2 Gang (Ant. 19—377mmf, Osc. 17—125mmf)
M3	Tuning Cap	25B10	FM, 2 Gang
M4	Switch	43B58	Function (Lever Type)
M5	Switch	43A60	AFC Off-On, (SPDT Slide Type)
M6	Switch	43A60	Power Off-On, (SPDT Slide Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	84A36	Tuning, FM, AM
Knob	84A29	Function
Pointer	72A276	FM
Pointer	72A277	AM
Dial Glass	86B45	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

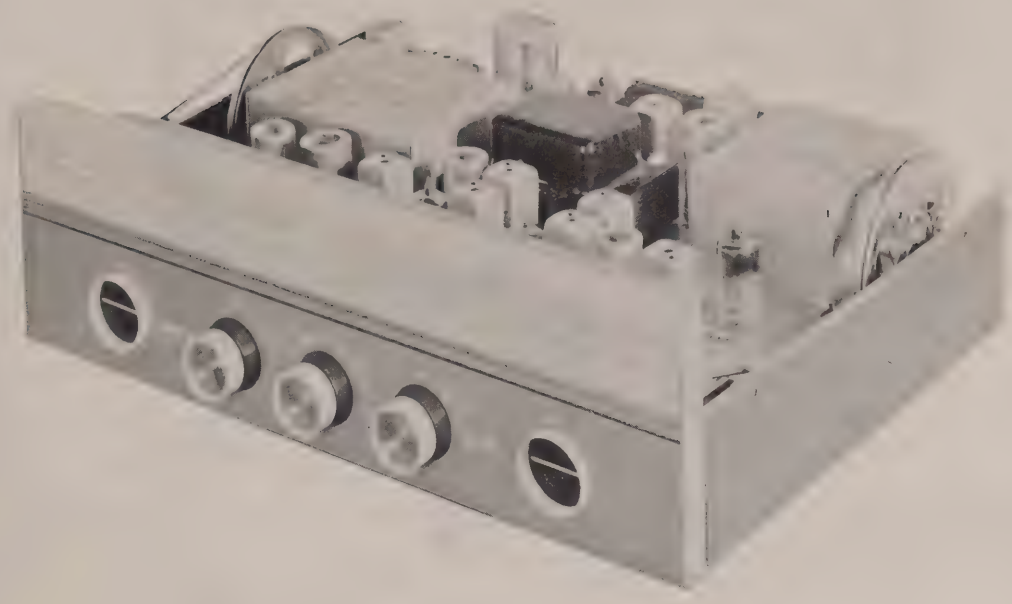
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

BOGEN
MODEL ST-662

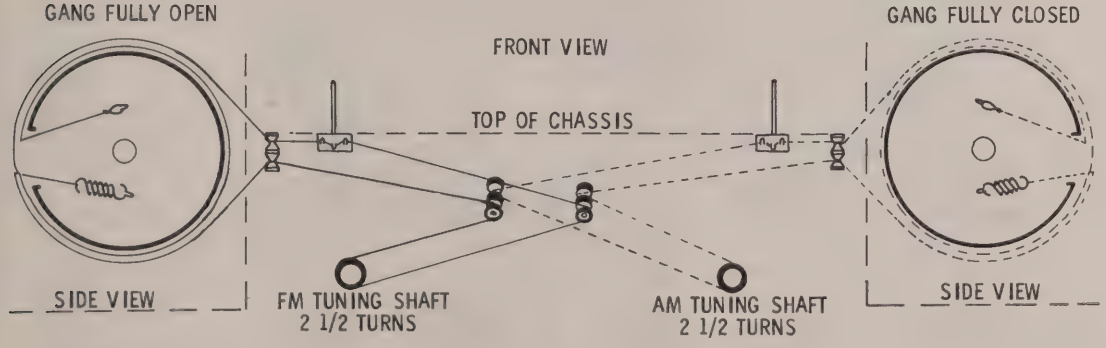
BOGEN
MODEL ST-662



BOGEN
MODEL ST-662

TRADE NAME	Bogen Model ST-662		
MANUFACTURER	Bogen-Presto Co., A Div. of the Siegler Corp., P. O. Box 500, Paramus, N. J.		
TYPE SET	AC Operated 12 Tube FM-AM Tuner		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	50 Watts, .5 Amp. @ 117 Volts AC (FM)
TUNING RANGE	BROADCAST 520 - 1640KC	FREQ. MOD.	88 - 108MC

DIAL CORD STRINGING



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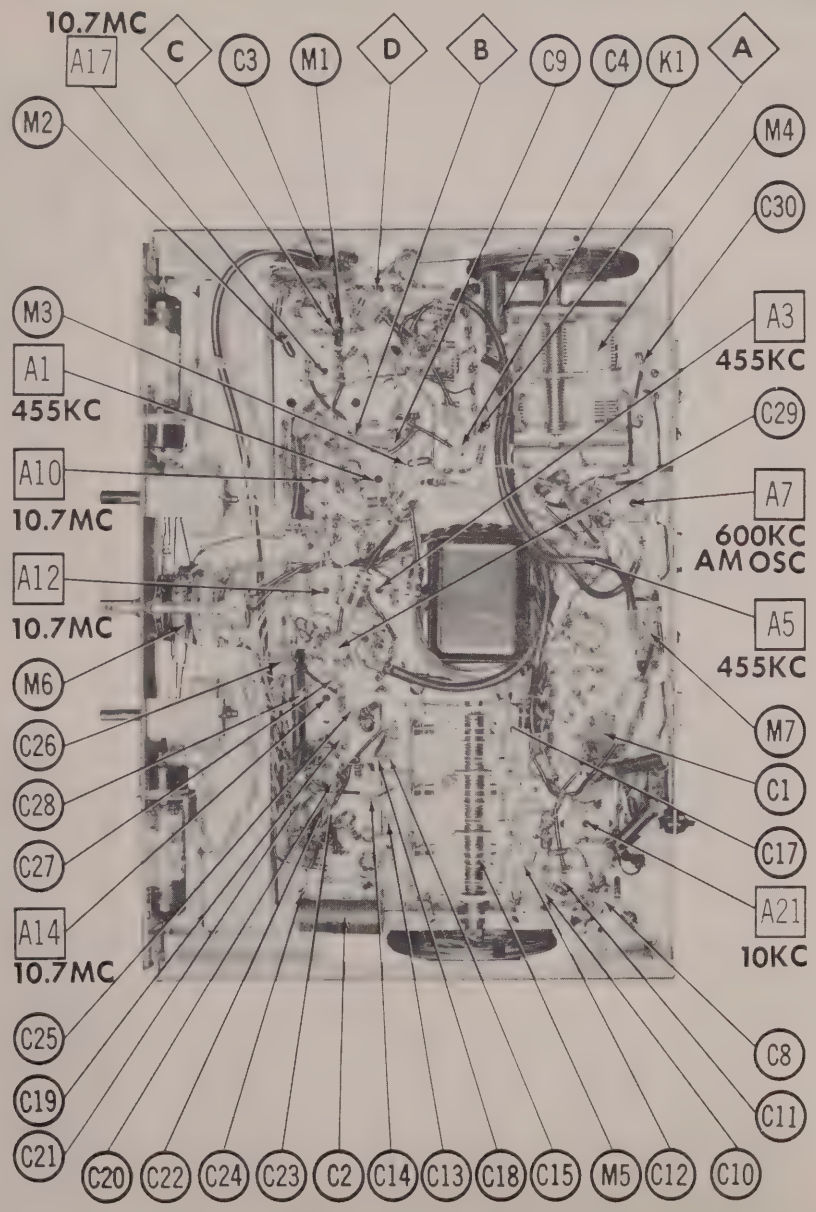
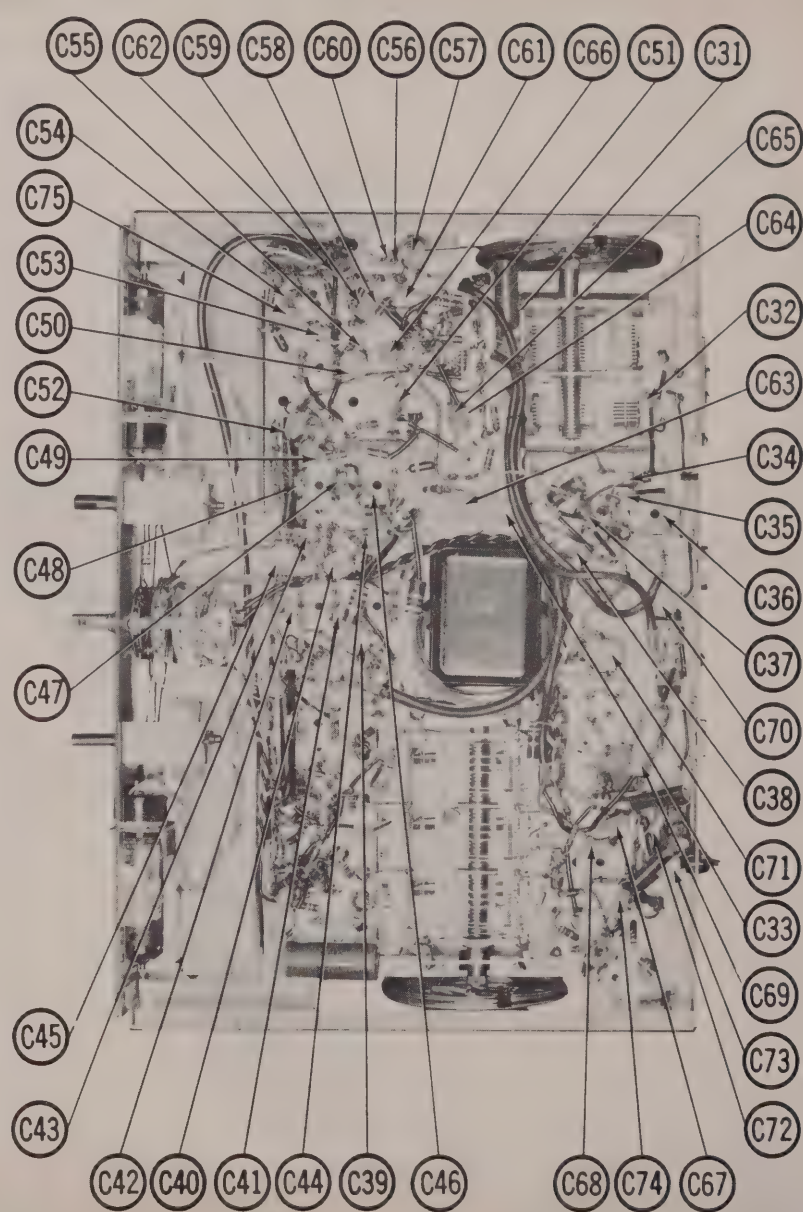
JL457

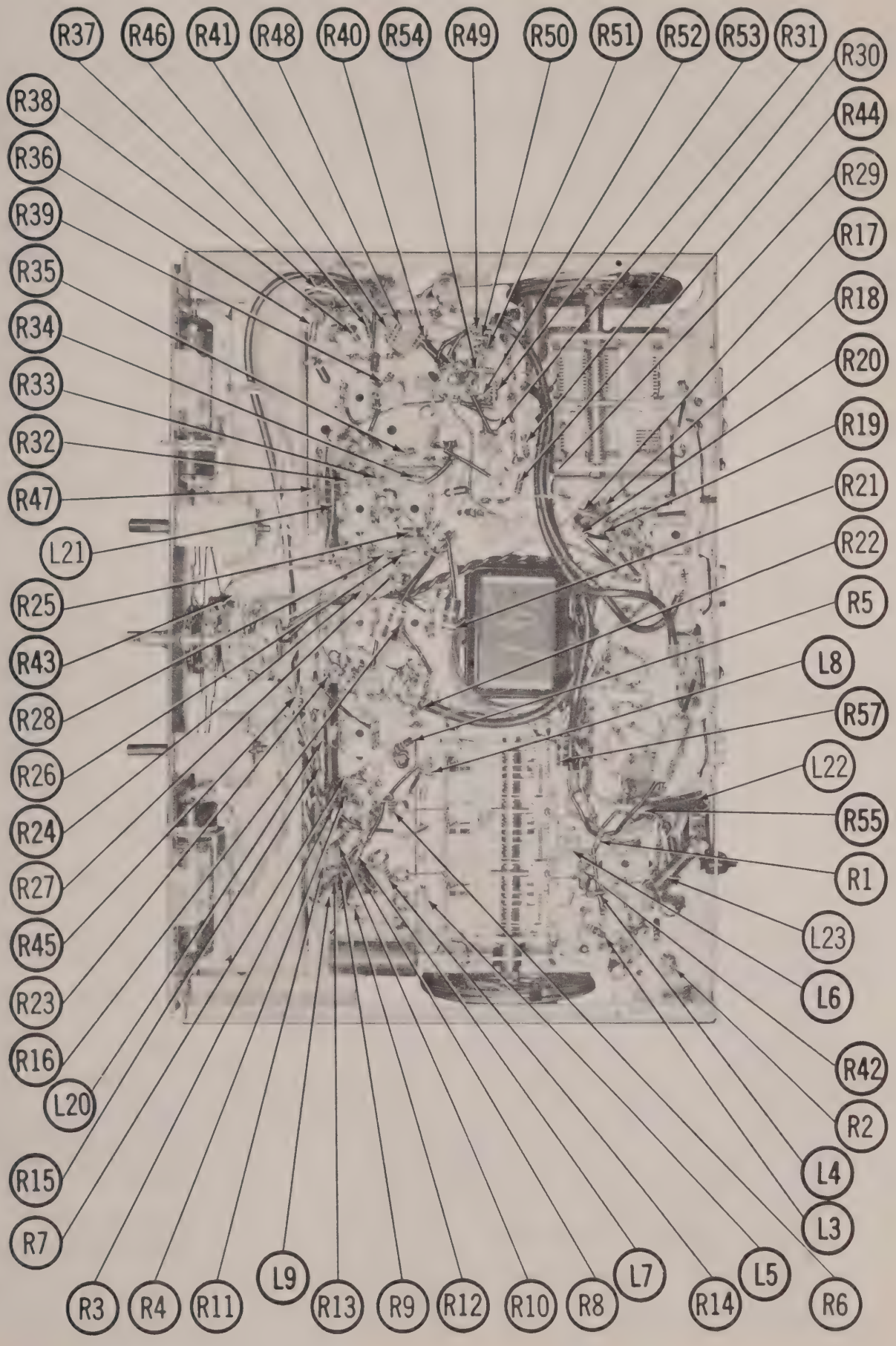
SET 477 FOLDER 4



CHASSIS BOTTOM VIEW
ALIGNMENT, CAPACITOR & MISC. IDENT.



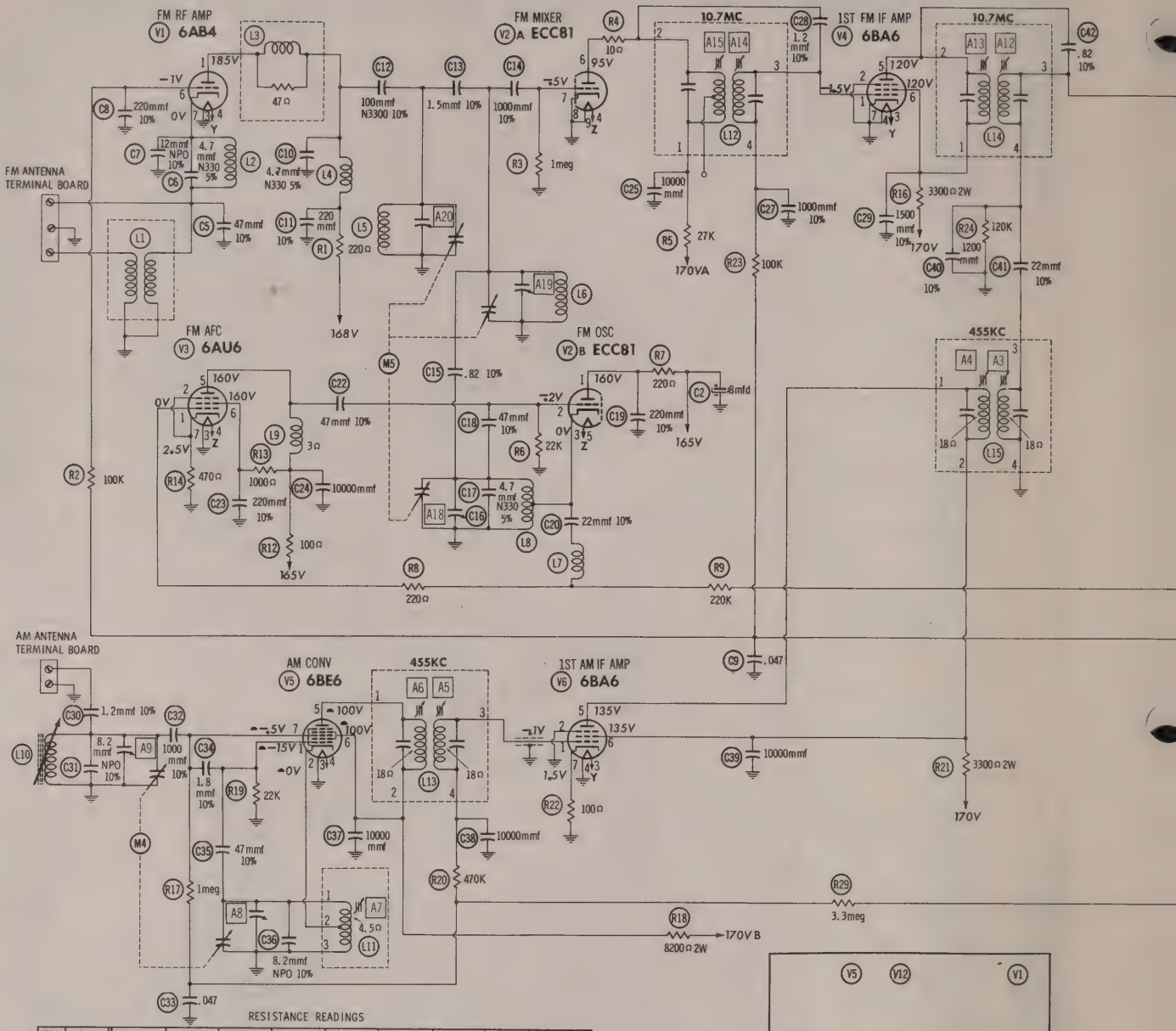
CHASSIS BOTTOM VIEW - CAPACITOR IDENT.



CHASSIS BOTTOM VIEW - RESISTOR & INDUCTOR IDENT.

BOGEN
MODEL ST-662

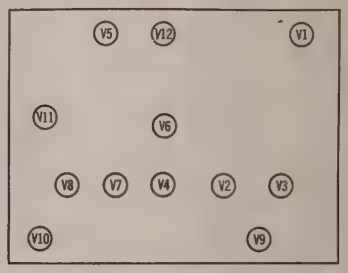
FOLDER 4



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AB4	†970Ω	TP	0Ω	.1Ω	TP	1.3meg	.2Ω		
V2	ECC81 12AT7	†2900Ω	22K	0Ω	.1Ω	.1Ω	†29K	1meg	0Ω	0Ω
V3	6AU6	700K	470Ω	0Ω	.1Ω	†2700Ω	†3700Ω	470Ω		
V4	6BA6 EF93	1.3meg	0Ω	.1Ω	0Ω	†4000Ω	†4000Ω	0Ω		
V5	6BE6	▪22K	.8Ω	0Ω	.1Ω	†▪8900Ω	†▪8900Ω	▪4.7meg		
V6	6BA6 EF93	4meg	0Ω	.1Ω	0Ω	†▪4000Ω	†▪4000Ω	100Ω		
V7	6AU6	120K	0Ω	.1Ω	0Ω	†5400Ω	†16K	136Ω		
V8	6AU6	100K	0Ω	.1Ω	0Ω	†40K	†40K	0Ω		
V9	EM840	1meg	†1700Ω	0Ω	0Ω	.1Ω	†1700Ω	†470K	†1700Ω	†470K
V10	EM840	1meg	†1700Ω	0Ω	0Ω	.1Ω	†1700Ω	†470K	†1700Ω	†470K
V11	ECC81 12AT7	†2700Ω	480K	15K	0Ω	0Ω	†▪750Ω	485K	22K	.1Ω
V12	EZ80	168Ω	NC	¶	0Ω	.1Ω	NC	168Ω	NC	NC

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
▪ MEASURED IN "AM" POSITION.
† MEASURED FROM PIN 3 OF V12.
■ MEASURED FROM PIN 7 OF V11.
♦ MEASURED FROM PIN 8 OF V11.
NC NO CONNECTION
TP TIE POINT



TUBE LAYOUT
(BOTTOM VIEW)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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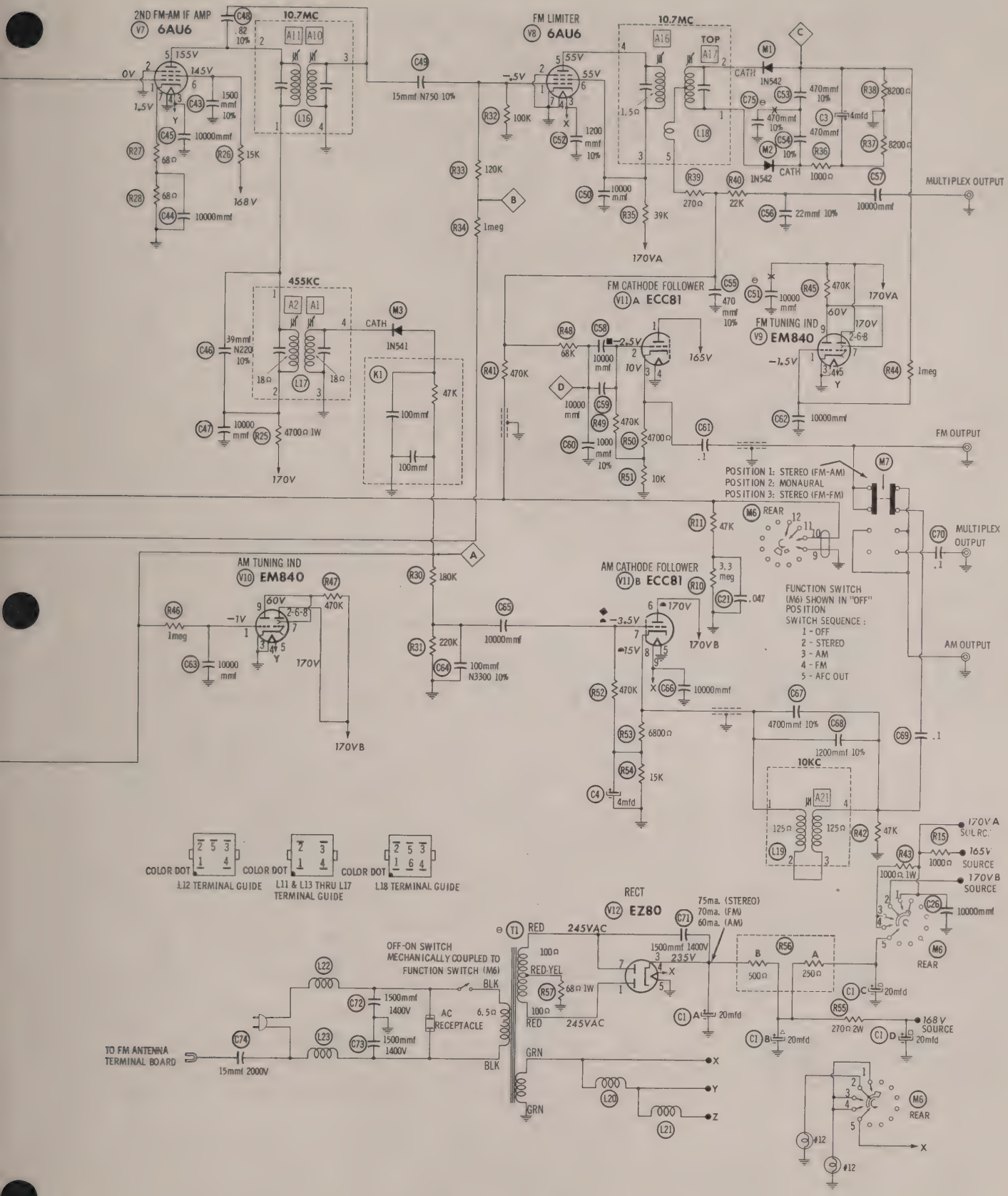


BOGEN
MODEL ST-662

FOLDER 4

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Volume control should be at maximum position. Output of signal generator should no higher than necessary to obtain an output reading.

Suggested Alignment Tools:

A1 thru A6, A10 thru A17, A21	GENERAL CEMENT #5097, 8727 WALSCO #2515
A7	GENERAL CEMENT #8282, 8606, 8606L, 9295 WALSCO #2526, 2543, 2544, 2545
A8, A9, A19, A20	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A18	GENERAL CEMENT #8721, 8722 WALSCO #2519

AM ALIGNMENT

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .01mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400∿ Mod.)	AM	High frequency end stop	DC probe to point (A). Common to chassis.	A1, A2, A3, A4, A5, A6	Adjust for maximum deflection.
2.	Across AM antenna terminals.	600KC	"	600KC	"	A7	"
3.	"	1500KC	"	1500KC	"	A8, A9	Adjust for maximum deflection. Repeat steps 2 and 3.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	High side thru .01mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC	FM	Point of non-interference	DC probe to point (B). Common to chassis.	A10, A11, A12, A13, A14, A15	Adjust for maximum deflection.
5.	"	"	"	"	DC probe to point (C). Common to chassis.	A16	"
6.	"	"	"	"	DC probe to point (D). Common to chassis.	A17	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	High side thru .01mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (450KC Swp)	FM (AFC out)	Point of non-interference	Vert. Amp. thru 100K to point (B). Low side to chassis.	A10, A11, A12, A13, A14, A15	Adjust for maximum gain and symmetry of response similar to Fig. 1.
5.	"	"	"	"	Vert. Amp. thru 100K to point (C). Low side to chassis.	A16	Disconnect Stabilizing Capacitor C3. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C3.
6.	"	"	"	"	Vert. Amp. to point (D). Low side to chassis.	A17	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A16 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	Thru dummy (Fig. 3) to antenna terminals.	104MC (Unmod.)	FM (AFC out)	104MC	DC probe to point (B). Common to chassis.	A18, A19, A20	Adjust for maximum deflection. Check for tracking.

10KC WHISTLE FILTER

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	High side thru .01mfd to pin 7 (grid) of AM Cathode Follower. Low side to chassis.	10KC	AM	Point of non-interference	AC probe to AM output jack. Common to chassis.	A21	Adjust for MINIMUM deflection.

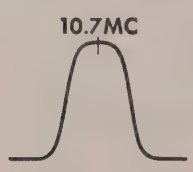


FIG. 1

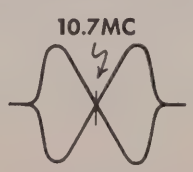


FIG. 2

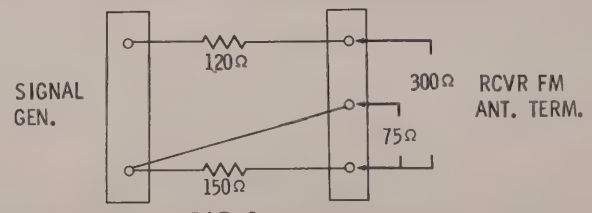


FIG. 3

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	FM RF Amplifier	6AB4	V8	FM Limiter	6AU6
V2	FM Mixer - FM Osc.	ECC81/12AT7	V9	FM Tuning Indicator	EM840
V3	FM AFC	6AU6	V10	AM Tuning Indicator	EM840
V4	1st FM IF Amplifier	6BA6/EF93	V11	FM Cathode Follower - AM Cathode Follower	ECC81/12AT7
V5	AM Converter	6BE6	V12	Rectifier	EZ80
V6	1st AM IF Amplifier	6BA6/EF93			
V7	2nd FM-AM IF Amplifier	6AU6			

ELECTROLYTIC CAPACITORS

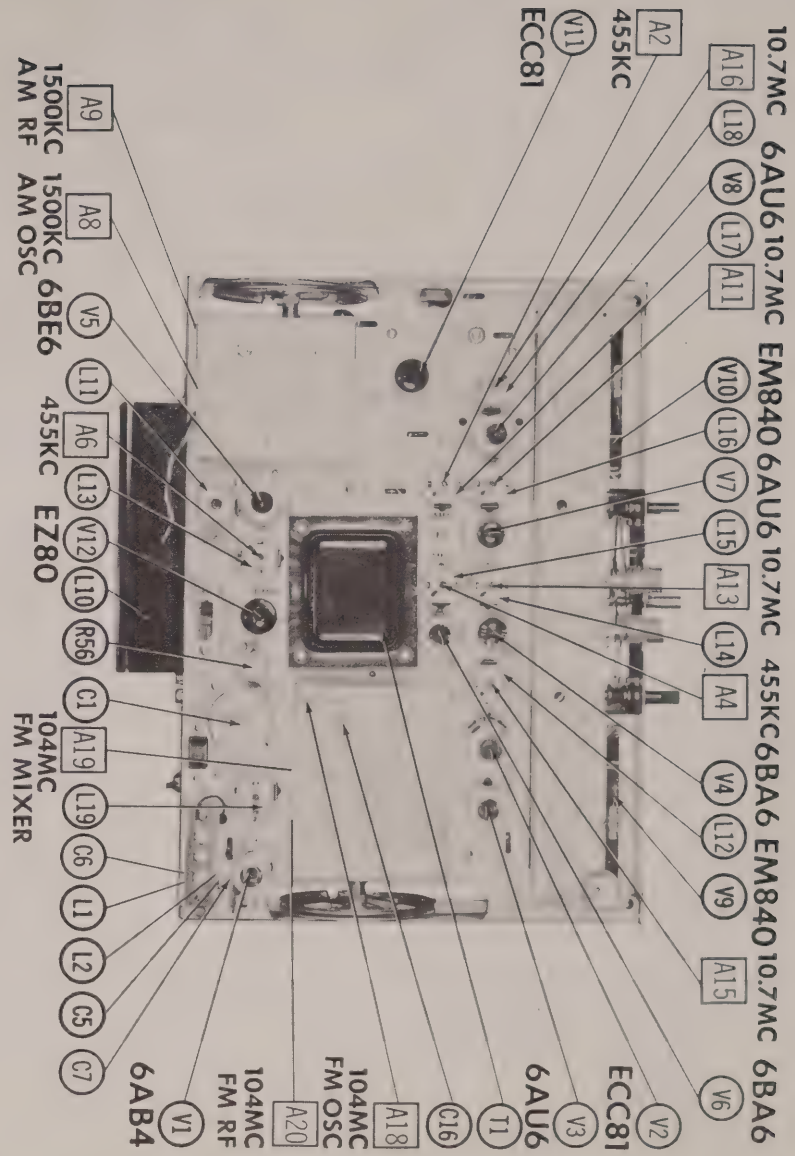
ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BOGEN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	20	350		AFH4-14	D0130	FP444	TMQ-12	TVL-4763	
B	▲20	350							
C	●20	350							
D	■20	350							
C2	8	250		PRS1555	BBR8-250	TC51	TD-8-250	TVA-1503	
C3	4	15		XPP-15004	BBR4-50	TT50X4	TD-4-25	TE-1151	
C4	4	15		XPP-15004	BBR4-50	TT50X4	TD-4-25	TE-1151	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	47		10%		DI-47	DD-470	L10Q47	CCD-470 *	GP447	10TS-Q47
C6	4.7	N330	5%							
C7	12	NPO	10%			TCZ-12	C10Q12C	CCTO-120	CNO-412	10TCC-Q12
C8	220		10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C9	.047	200V			P288N-047	DD-503	CUB2S47	4DP-3-473 *	GEM-4147	2TM-S47
C10	4.7	N330	5%							
C11	220		10%		DI-220	DD-221	L10T22	CCD-221 *	GP322	10TS-T22
C12	100	N3300	10%							
C13	1.5		10%		NPO-SI 1.5	DTZ-1R5	C10V15C		CNO-515	10TCC-V15
C14	1000		10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C15	.82		10%							
C16										
C17	4.7	N330	10%					*		
C18	47		10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C19	220		10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C20	22		10%		DI-22	DD-220	L10Q22	CCD-220	GP422	10TS-Q22
C21	.047	200V			P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C22	47		10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C23	220		10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C24	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C25	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C26	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C27	1000		10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C28	1.2		10%		NPO-SI 1.5	DTZ-1R5	C10V15C		CNO-515	10TCC-V12
C29	1500		10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C30	1.2		10%		NPO-SI 1.5	DTZ-1R5	C10V15C		CNO-515	10TCC-V12
C31	8.2	NPO	10%		NPO-DI 8.2		C10V82C			10TCC-V82
C32	1000		10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C33	.047	200V			P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C34	1.8		10%		NPO-SI 2		C10V2C			10TCC-V18
C35	47		10%		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C36	8.2	NPO	10%		NPO-DI 8.2		C10V82C			10TCC-V82
C37	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C38	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C39	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C40	1200		10%		DI-1200	DD-122	PM6D1	CCD-122	GP212	10TS-D12
C41	22		10%		DI-22	DD-220	L10Q22	CCD-220	GP422	10TS-Q22
C42	.82		10%							
C43	1500		10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C44	10000				BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C45	10000				BPD-01	DD-103	BYA10S1	CCD-103 *	GP110	5HK-S10
C46	39	N220	10%							10TCR-Q39

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C47	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C48	.82 10%							
C49	15 N750 10%		N750-DI 15	TCN-15	C10Q15U	CCTN-150	CN7-415	10TCU-Q15
C50	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C51	10000	Note 1	BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C52	1200 10%		DI-1200	DD-122	PM6D1	CCD-122	GP122	10TS-D12
C53	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C54	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C55	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47
C56	22 10%		DI-22	DD-220	L10Q22	CCD-220	GP422	10TS-Q22
C57	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C58	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C59	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C60	1000 10%		DI-100	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C61	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C62	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C63	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C64	100 N3300 10%					*		
C65	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C66	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C67	4700 10%		DI-4700		1R5D47	CCD-472	JL-247	10TS-D47
C68	1200 10%		DI-1200	DD-122	1R5D12	CCD-122	GP122	10TS-D12
C69	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C70	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C71	1500 1400V		HVD-15-1500	DD30-152	HVC16D15	16DP-1-152	2HV-215	30GA-D15
C72	1500 1400V		HVD-15-1500	DD30-152	HVC16D15	16DP-1-152	2HV-215	30GA-D15
C73	1500 1400V		HVD-15-1500	DD30-152	HVC16D15	16DP-1-152	2HV-215	30GA-D15
C74	15 2000V		HVD-30-15	DD30-150	HVA20Q15	VCM-20-150M	2DY-415	30GA-Q15
C75	470 10%		DI-470	DD-471	5R5T47	CCD-471	GP347	10TS-T47

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
Note 1. Not used in some versions.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R1	220Ω	
R2	100K	
R3	1meg	
R4	10Ω	
R5	27K	
R6	22K	
R7	220Ω	
R8	220Ω	
R9	220K	
R10	3.3meg	
R11	47K	
R12	100Ω	
R13	1000Ω	
R14	470Ω	
R15	1000Ω	
R16	3300Ω 2W	
R17	1meg	
R18	8200Ω 2W	
R19	22K	
R20	470K	

ITEM No.	RATING	REMARKS
R21	3300Ω 2W	
R22	100Ω	
R23	100K	
R24	120K	
R25	4700Ω 1W	
R26	15K	
R27	68Ω	
R28	68Ω	
R29	3.3meg	
R30	180K	
R31	220K	
R32	100K	
R33	120K	
R34	1meg	
R35	39K	
R36	1000Ω	
R37	8200Ω	
R38	8200Ω	
R39	270Ω	
R40	22K	

ITEM No.	RATING	REMARKS
R41	470K	
R42	47K	
R43	10000Ω 1W	
R44	1meg	
R45	470K	
R46	1meg	
R47	470K	
R48	68K	
R49	470K	
R50	4700Ω	
R51	10K	
R52	470K	
R53	6800Ω	
R54	15K	
R55	270Ω 2W	
R56A	250Ω	
B	500Ω	
R57	68Ω 1W	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	BOGEN PART No.	REPLACEMENT DATA	
K1	AM Diode RF Filter	100mmf, 100mmf, 47K	78-907-001	Aerovox	PA-97
				Centralab	PC-50
				Cornell-Dubilier	111TM1
				Sprague	D-1

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		BOGEN PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	FM Antenna Coil	U452						
L2	FM Antenna Coil	U451	19-1000	19-1000	BC-561	4602		1uh
L3	RF Choke	U514						①
L4	RF Choke	U420	19-1001	19-1001	BC-562	4604		1.7uh
L5	FM RF Coil	95-0003-21						
L6	FM Mixer Coil	95-0003-22						
L7	RF Choke	U432	19-1000	19-1000	BC-561	4602		1.1uh
L8	FM Osc. Coil	95-0005-04						
L9	RF Choke	U507						
L10	Loopstick	H668						
L11	AM Osc. Coil	H454	14-1412	14-1412				
L12	1st FM IF Trans.	H615	16-3487	16-3487	FM-254	1463		
L13	1st AM IF Trans.	H297	16-6758	16-6758	BC-352	12-C1	RF-1	
L14	2nd FM IF Trans.	H355	16-3487	16-3487	FM-254	1463		
L15	2nd AM IF Trans.	H297	16-6758	16-6758	BC-353	12-C2	RF-2	
L16	3rd FM IF Trans.	H355	16-3487	16-3487	FM-254	1463		
L17	3rd AM IF Trans.	H297	16-6758	16-6758	BC-353	12-C2	RF-2	
L18	Ratio Detector	H387	17-3498	17-3498	FM-255	1465		
L19	10KC Filter	H627						
L20	Fil. Choke	U512						1.9uh
L21	Fil. Choke	U512						1.9uh
L22	Line Choke	U512						1.9uh
L23	Line Choke	U512						1.9uh

① Three turns Wire on 47Ω Resistor.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	BOGEN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .55A	490VCT @ .075A	6.3V @ 4.2A	83-505-200 ①	26R31			PM8420	26R31	R-10B

① Alternate Part #83-571-000.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		BOGEN PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M1	1N542		1N60	1N295	1N295	FM Detector (Pigtail)
M2	1N542		1N60	1N295	1N295	FM Detector (Pigtail)
M3	1N541		1N60	1N295	1N295	AM Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	BOGEN PART No.	NOTES
M4	Tuning Cap.	80-0117-01	AM 3 Gang (Ant. 25-535mmf, Osc. 23-195mmf)
M5	Tuning Cap.	80-0116-01	FM 3 Gang
M6	Switch	S538	Funtion
M7	Switch	S475	Stereo-Monaural (4PTT) Slide Type

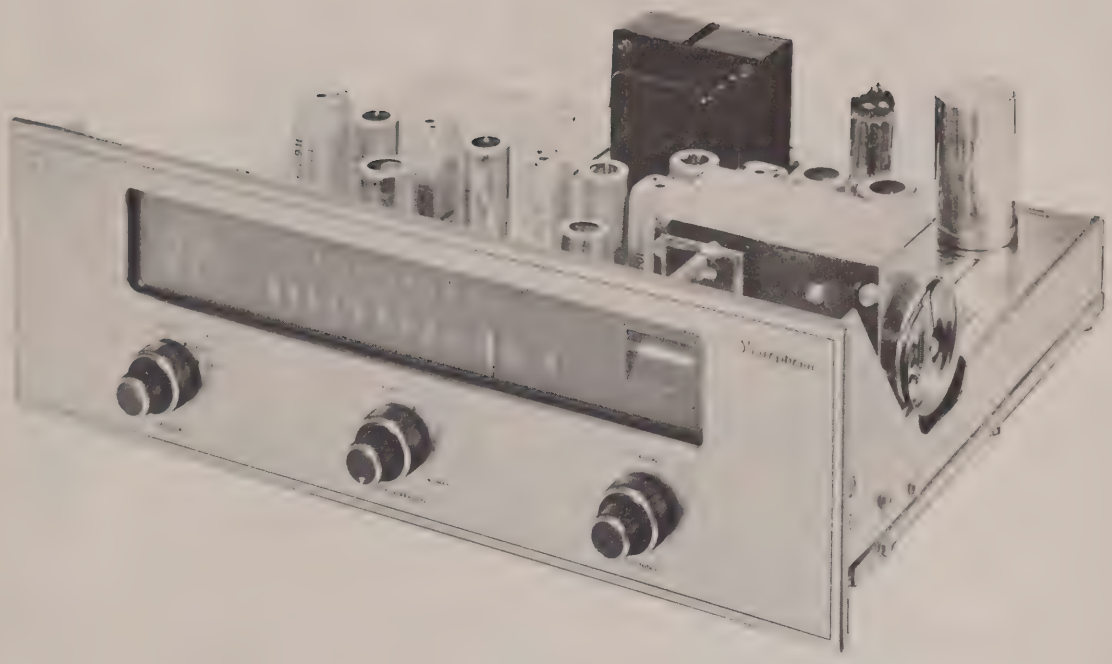
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder

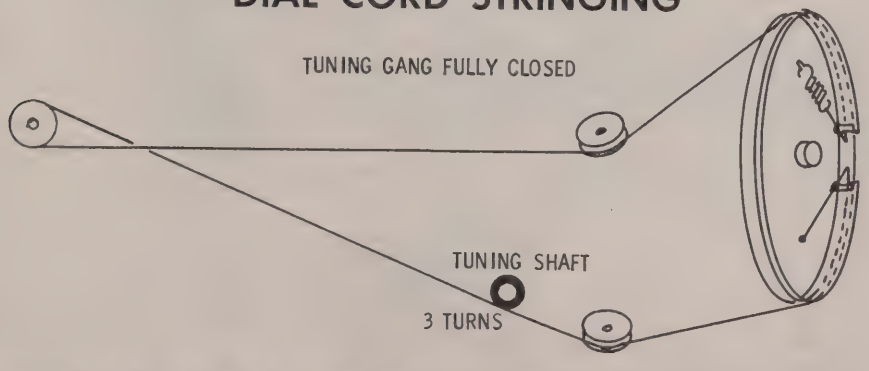
FISHER
MODEL FM-100



FISHER
MODEL FM-100

TRADE NAME	Fisher Model FM-100 (Serial #10001-19999 Inclusive)
MANUFACTURER	Fisher Radio Corp., 21-21 44th Drive., Long Island City 1, N. Y.
TYPE SET	AC Operated 10 Tube FM Tuner
POWER SUPPLY	105-120 Volts AC, 60 Cycles
TUNING RANGE — FREQ. MOD.	88-108 RATING 43 Watts, .4 Amp. @117 Volts AC

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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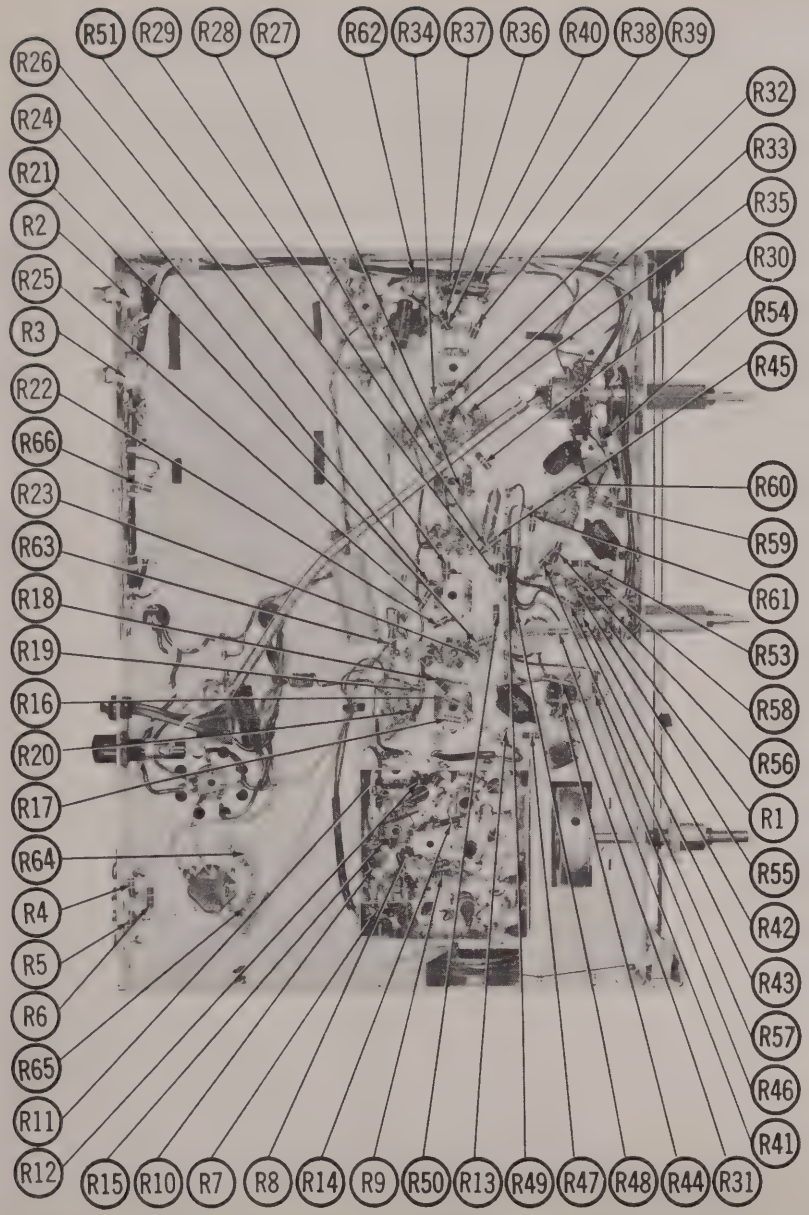
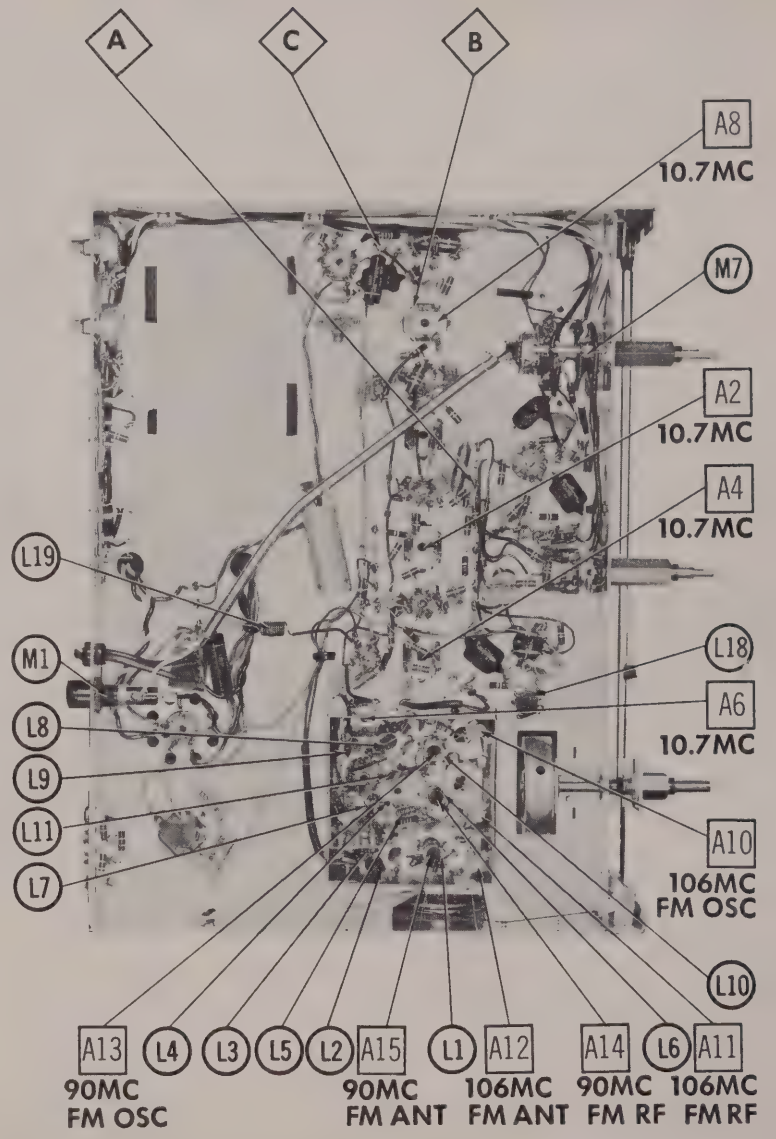
JJ634

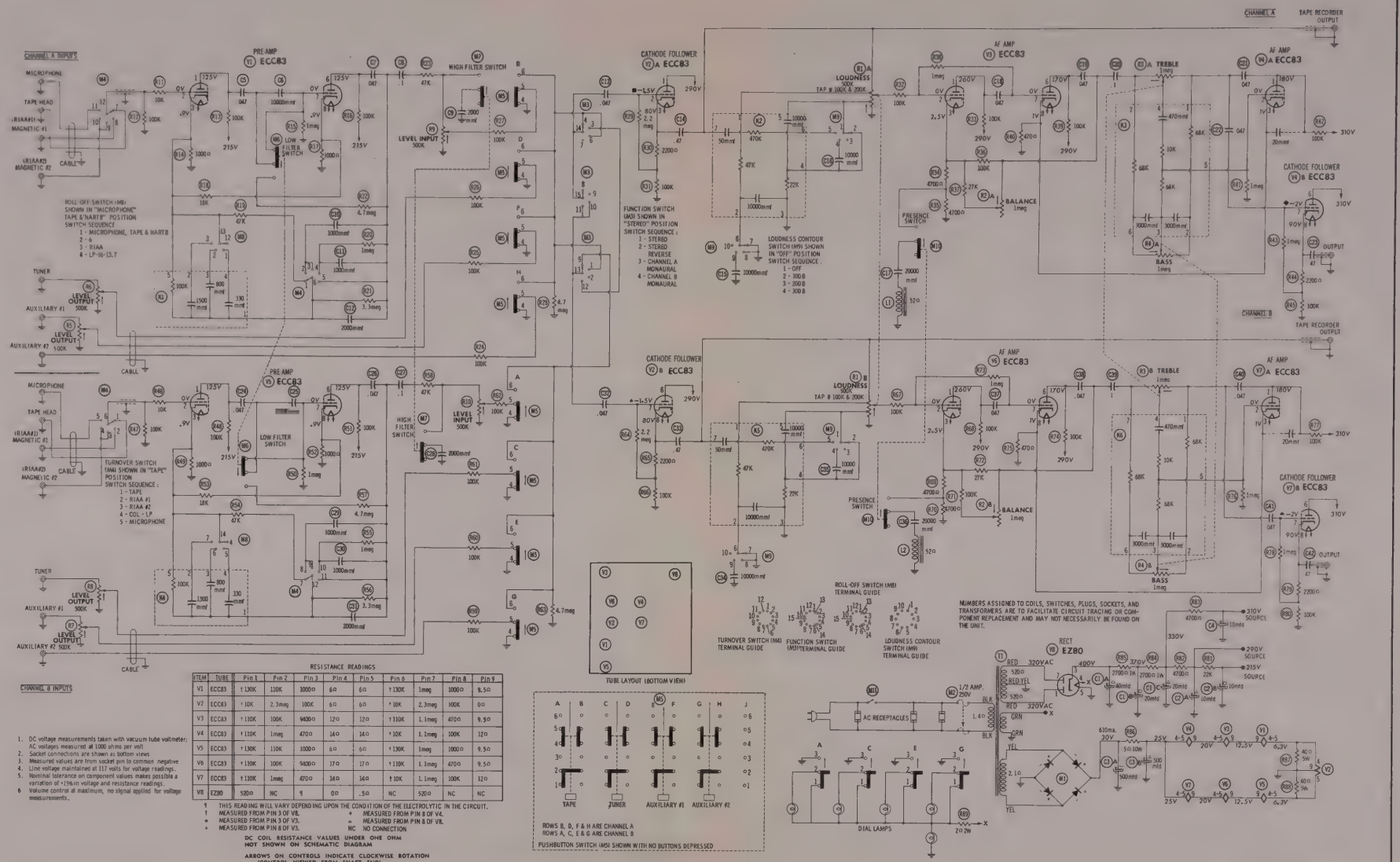
SET 477 FOLDER 5



CHASSIS BOTTOM VIEW - RESISTOR IDENT.



CHASSIS BOTTOM VIEW
ALIGNMENT, INDUCTOR & MISC IDENT.


CHANNEL A INPUTS
MICROPHONE
TAPE HEAD
(RIAA#1) MAGNETIC #1
(RIAA#2) MAGNETIC #2
CABLE
TUNER
AUXILIARY #1
AUXILIARY #2
LEVEL OUTPUT 500K
PRE-AMP V1 ECC83
PRE-AMP V5 ECC83
HIGH FILTER SWITCH M7
LOW FILTER SWITCH M6
LEVEL INPUT 500K
ROLL-OFF SWITCH (M8) SHOWN IN "MICROPHONE" TAPE & NARTB" POSITION SWITCH SEQUENCE
1 - MICROPHONE, TAPE & NARTB
2 - 6
3 - RIAA
4 - LP-66-13.7
TURNOVER SWITCH (M4) SHOWN IN "TAPE" POSITION SWITCH SEQUENCE :
1 - TAPE
2 - RIAA #1
3 - RIAA #2
4 - COL - LP
5 - MICROPHONE
CATHODE FOLLOWER V2 A ECC83
CATHODE FOLLOWER V2 B ECC83
FUNCTION SWITCH (M3) SHOWN IN "STEREO" POSITION SWITCH SEQUENCE :
1 - STEREO
2 - STEREO REVERSE
3 - CHANNEL A MONAURAL
4 - CHANNEL B MONAURAL
LOUDNESS 500K TAP @ 100K & 200K
LOUDNESS CONTOUR SWITCH (M9) SHOWN IN "OFF" POSITION SWITCH SEQUENCE :
1 - OFF
2 - 100 B
3 - 200 B
4 - 300 B
AF AMP V3 ECC83
AF AMP V4 A ECC83
AF AMP V6 ECC83
AF AMP V7 A ECC83
TREBLE 1meg
BASS 1meg
PRESENCE SWITCH
BALANCE 1meg
CATHODE FOLLOWER V4 B ECC83
CATHODE FOLLOWER V7 B ECC83
OUTPUT
TAPE RECORDER OUTPUT
CHANNEL A
CHANNEL B
TURNOVER SWITCH (M4) TERMINAL GUIDE
FUNCTION SWITCH (M3) TERMINAL GUIDE
LOUDNESS CONTOUR SWITCH (M9) TERMINAL GUIDE
ROLL-OFF SWITCH (M8) TERMINAL GUIDE
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
RECT V9 EZ80
1/2 AMP.
AC RECEPTACLES
DIAL LAMPS
310V SOURCE
290V SOURCE
215V SOURCE
330V
TUBE LAYOUT (BOTTOM VIEW)
TAPE
TUNER
AUXILIARY #1
AUXILIARY #2
ROWS B, D, F & H ARE CHANNEL A
ROWS A, C, E & G ARE CHANNEL B
PUSHBUTTON SWITCH (M5) SHOWN WITH NO BUTTONS DEPRESSED

CHANNEL B INPUTS

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83	↑130K	110K	1000Ω	6Ω	6Ω	↑130K	1meg	1000Ω	9.5Ω
V2	ECC83	↑10K	2.3meg	100K	6Ω	6Ω	↑10K	2.3meg	100K	0Ω
V3	ECC83	↑110K	100K	9400Ω	12Ω	12Ω	↑110K	1.1meg	470Ω	9.5Ω
V4	ECC83	↑110K	1meg	470Ω	14Ω	14Ω	↑10K	1.1meg	100K	12Ω
V5	ECC83	↑130K	110K	1000Ω	6Ω	6Ω	↑130K	1meg	1000Ω	9.5Ω
V6	ECC83	↑110K	100K	9400Ω	17Ω	17Ω	↑110K	1.1meg	470Ω	9.5Ω
V7	ECC83	↑110K	1meg	470Ω	14Ω	14Ω	↑10K	1.1meg	100K	12Ω
V8	EZ80	520Ω	NC	¶	0Ω	.5Ω	NC	520Ω	NC	NC

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V8. ◆ MEASURED FROM PIN 8 OF V4.
= MEASURED FROM PIN 3 OF V3. ▫ MEASURED FROM PIN 8 OF V8.
• MEASURED FROM PIN 8 OF V3. NC NO CONNECTION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltages measured at 1000 ohms per volt
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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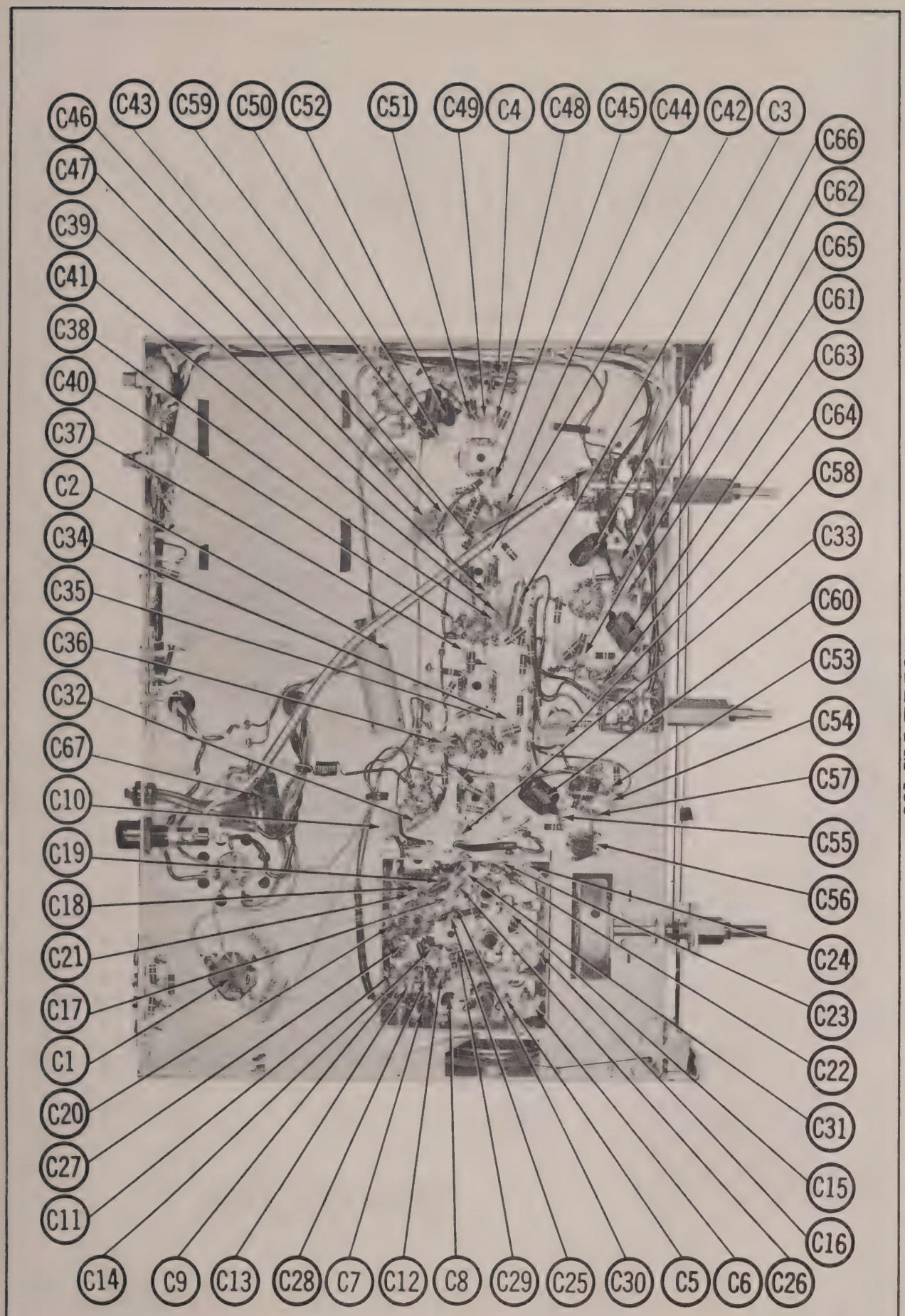
GROMMES MODEL 209



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Remove external antenna and link between terminals 1 and 2.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Suggested alignment tools: A1 thru A9, A13, A14, A15..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A10, A11, A12..... GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side to ungrounded tube shield floating over Mixer-Osc. (V2). Low side to chassis.	10.7MC (Unmod.)	Point of non-interference.	DC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4, A5, A6, A7	Adjust for maximum deflection.
2.	"	"	"	DC probe to point Ⓑ. Common to chassis.	A8	"
3.	"	"	"	DC probe to point Ⓒ. Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	High side to ungrounded tube shield floating over Mixer-Osc. (V2). Low side to chassis.	10.7MC (450KC Swp)	Point of non-interference	Vert. amp. to point Ⓐ. Low side to chassis.	A1, A2, A3, A4, A5, A6, A7	Adjust for maximum gain and symmetry of response similar to Fig. 1.
2.	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A8	Disconnect stabilizing capacitor C4. Adjust for maximum gain and symmetry of response similar to Fig. 1. Reconnect C4.
3.	"	"	"	Vert. amp. to point Ⓒ. Low side to chassis.	A9	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines.

RF ALIGNMENT

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	Across antenna terminals 2 and 3 with 120Ω in each lead.	106MC (Unmod.)	106MC	DC probe to point Ⓐ. Common to chassis.	A10, A11, A12	Adjust for maximum deflection.
5.	"	90MC	90MC	"	A13, A14, A15	"

FIG. 1

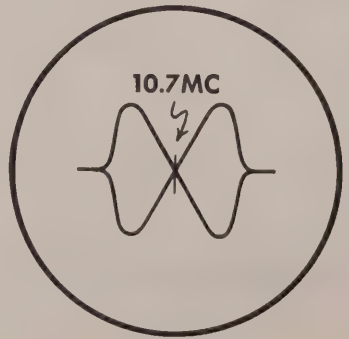


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	RF Amplifier	ECC88 (6DJ8) *	V6	Limiter	6AU6
V2	Mixer-Osc.	ECC85 (6AQ8)*	V7	Squelch	6AV6
V3	1st IF Amplifier	6AU6	V8	Tuning Indicator	EM84 (6FG6) *
V4	2nd IF Amplifier	6AU6	V9	Channel A AF Amp.	ECC83
V5	3rd IF Amplifier	6AU6		Channel B AF Amp.	(12AX7, 7025) *
			V10	Rectifier	EZ80 (6V4) *

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	FISHER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	300	C670-125	AFH4-02	C0870	FP327.89	TMT-181	TVLS-3561.4*	
B	■40	250			BR4025				
C	▲40	250							
C2	20	250	C746-145	PRS1570	BR2025	TC55	TD-20-250	TVA-1508	
C3	1	50	C746-144	SRE50V1	NLW1-50	TC-31	ML1-50	TE-1300	
C4	8	50	C629-138	PRS1405	NLW8-100	TT150X8	ML8-50	TE-1303.3	

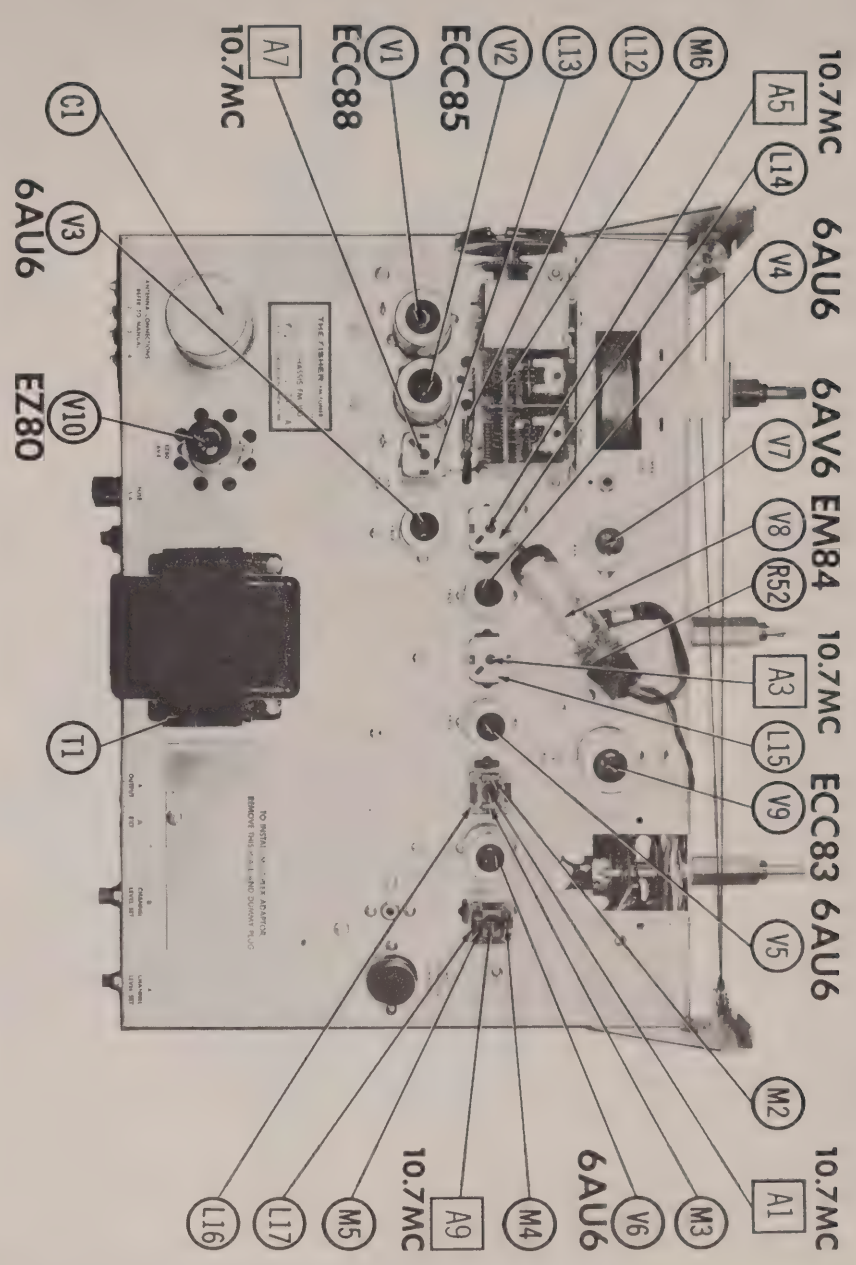
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	8 NPO .5mmf	#CC20CJ080D5			C10V8C			
C6		#C662-123						
C7	100 N1500 10% 1000V	#C50070-6				*		
C8	100 N1500 10% 1000V	#C50070-6				*		
C9	1000		EF-001	MFT-1000		CCF-102	CT280A	
C10	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C11	1000		EF-001	MFT-1000		CCF-102	CT280A	
C12	1000		EF-001	MFT-1000		CCF-102	CT280A	
C13	1000		EF-001	MFT-1000		CCF-102	CT280A	
C14	1000 1000V 10%		DI-1000	DD-102		CCD-102	GP210	10TS-D10
C15	8 NPO .5mmf	#CC20CJ080D5			C10V8C			
C16		#C662-123						
C17	68 N750 10%		N750-SI 68	TCN-68	C10Q68U	CCTN-680	CN7-468	10TCU-Q68
C18	100 N1500 5% 1000V	#C-50070-19				*		
C19	1000 1000V 10%		DI-1000	DD-102		CCD-102	GP210	10TS-D10
C20	24 N150 5% 1000V	#C50070-8				*		10TCP-Q22
C21	47 N750 10% 1000V				C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C22	5 N150 .5mmf	#CC20PJ050D5				*		10TCP-V50
C23	5 N220 .5mmf	#CC20RH050D5				*		10TCR-V50
C24		#C662-123						
C25	100 N1500 10% 1000V	#C50070-6				*		
C26	100 N1500 10% 1000V	#C50070-6				*		
C27	5000	Note 1	BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C28	1000		EF-001	MFT-1000		CCF-102	CT280A	
C29	1000		EF-001	MFT-1000		CCF-102	CT280A	
C30	1000		EF-001	MFT-1000		CCF-102	CT280A	
C31	1000		EF-001	MFT-1000		CCF-102	CT280A	
C32	2700 1000V 10%		DI-2700			CCD-272		10TS-D27
C33	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C34	2700 1000V 10%		DI-2700			CCD-272		10TS-D27
C35	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C36	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C37	47 N750 10% 1000V				C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C38	2700 1000V 10%		DI-2700			CCD-272		10TS-D27
C39	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C40	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C41	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C42	12 NPO 1000V 10%				C10Q12C	CCTO-120	CNO-412	10TCC-Q12
C43	12 NPO 1000V 10%				C10Q12C	CCTO-120	CNO-412	10TCC-Q12
C44	2700 1000V 10%		DI-2700			CCD-272		10TS-D27
C45	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C46	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C47	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C48	330 1000V 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C49	330 1000V 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C50	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C51	330 1000V 10%		DI-330	DD-331	L10T33	CCD-331	GP333	10TS-T33
C52	.1 250V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C53	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C54	100 N1500 1000V 10%	#C50070-6				*		
C55	100 N1500 1000V 10%	#C50070-6				*		
C56	5 NPO .5mmf		NPO-S1 5.0	TCZ-4R7	C10V5C	CCTO-050	CNO-547	10TCC-V50
C57	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C58	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C59	.0033 200V		P288N-0033	D6-332	CUB6D33	6DP-1-332	GEM-6233	6TM-D33
C60	.1 250V		P288N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C61	18 N470 1000V 10%	#C50070-13				*		
C62	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C63	.1 250V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C64	18 N470 1000V 10%	#C50070-13				*		
C65	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C66	.1 250V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C67	.01 600V		P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S1

Note 1. Not used in some versions. # Fisher Part Number.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	FISHER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	100K	1/2	R50160-10					MPX Separation
B	100K	1/2						Muting
C	Switch							Muting Switch
R2	500K	1/2	R50103-6	BX-59	B47-500K-S	Q11-133	PTA55L	Level Set, Channel A
R3	500K	1/2	R50103-6	BX-59	B47-500K-S	Q11-133	PTA55L	Level Set, Channel B

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	330Ω	
R5	330Ω	
R6	2700Ω	
R7	100K	
R8	330K	
R9	330K	
R10	120Ω	
R11	470K	
R12	1000Ω	
R13	1000Ω	
R14	22Ω	
R15	2200Ω	
R16	470Ω	
R17	47K	
R18	1000Ω	
R19	82K	
R20	120Ω	
R21	82K	
R22	1000Ω	
R23	150Ω	(120Ω) *
R24	100K	

ITEM No.	RATING	REMARKS
R25	820K	
R26	120K	
R27	82K	
R28	1000Ω	
R29	22K	
R30	220K	
R31	220K	
R32	1000Ω	
R33	27K 1W	
R34	18K	
R35	100Ω	
R36	1000Ω	
R37	6800Ω	
R38	6800Ω	
R39	1500Ω	
R40	270Ω	
R41	270K	(680K) *
R42	56K	Note 1
R43	220K	
R44	100K	
R45	180K	

ITEM No.	RATING	REMARKS
R46	100K	
R47	68K	
R48	2.2meg	
R49	220K	
R50	15meg	
R51	820K	
R52	470K	
R53	220K	
R54	1.8meg	
R55	330K	
R56	22meg	
R57	100K	
R58	1.8meg	
R59	330K	
R60	22meg	
R61	100K	
R62	33K	
R63	4700Ω	
R64	330Ω 5W	
R65	330Ω 5W	
R66	220K	Note 1

* Alternate Value.
Note 1. Not used in some versions.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		FISHER PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Ant. Trans.	L726-124						
L2	RF Choke	L50066-2	19-1000	19-1000	BC-561	4602		1uh
L3	Cathode Choke	L50066-19						.56uh

COILS (RF-IF) (cont)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		FISHER PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L4	RF Choke	L50066-19						.56uh
L5	RF Choke	L629-180						①
L6	RF Coil	L726-126						
L7	Fil. Choke	L50066-3	19-1000	19-1000	BC-561	4602		1.2uh
L8	Cathode Choke	L50066-19						.56uh
L9	RF Choke	L50066-2	19-1000	19-1000	BC-561	4602		1uh
L10	Osc. Coil	L726-125						
L11	RF Choke	L50066-2	19-1000	19-1000	BC-561	4602		1uh
L12	RF Choke	L50066-3	19-1000	19-1000	BC-561	4602		1.2uh
L13	1st IF Trans.	ZZ662-117	16-3490	16-3490		1463-PC		
L14	2nd IF Trans.	ZZ50210-2	16-3487	16-3487	FM-254	1463		
L15	3rd IF Trans.	ZZ50210-2	16-3487	16-3487	FM-254	1463		
L16	Limiter	L551-121						
L17	Ratio Det.	ZZ592-170						
L18	Muting Osc. Coil	L50210-21						
L19	Fil. Choke	L520-156	19-1000	19-1000	BC-561	4602		1.2uh

① 5 Turns of Wire on 100Ω Resistor.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	FISHER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .4A	420 VCT ⓐ .048A	6.3V (Not Used)	T746-115						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V ⓐ 3.6A									

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FISHER PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1½A 125V S/B	F684-143	X1036	31301.5 (1½A 125V S/B)	342012	MDL 1½	HKP-CC

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		FISHER PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N295	V-1N295	1N636	1N295	1N295	Limiter (Clip In)
M3	1N295	V-1N295	1N636	1N295	1N295	Limiter (Clip In)
M4	1N541	*V-1N541	1N636	1N295	1N295	Ratio Det. (Clip In) Matched
M5	1N541	*V-1N541	1N636	1N295	1N295	Ratio Det. (Clip In) Pair

* Some versions may use a 1N542 in this application (Part #V-1N542).

MISCELLANEOUS

ITEM No.	PART NAME	FISHER PART No.	NOTES
M6	Tuning Cap.	C726-116	3 Gang
M7	Switch	S746-118	Function Selector

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder

GROMMES
MODEL 209

GROMMES
MODEL 209

GROMMES
MODEL 209

TRADE NAME	Grommes Model 209
MANUFACTURER	Precision Electronics, Inc., 9101 King Ave., Franklin Park, Illinois
TYPE SET	AC Operated 8 Tube Stereo Preamplifier
POWER SUPPLY	110-120 Volts AC, 50-60 Cycles RATING 37 Watts, .38 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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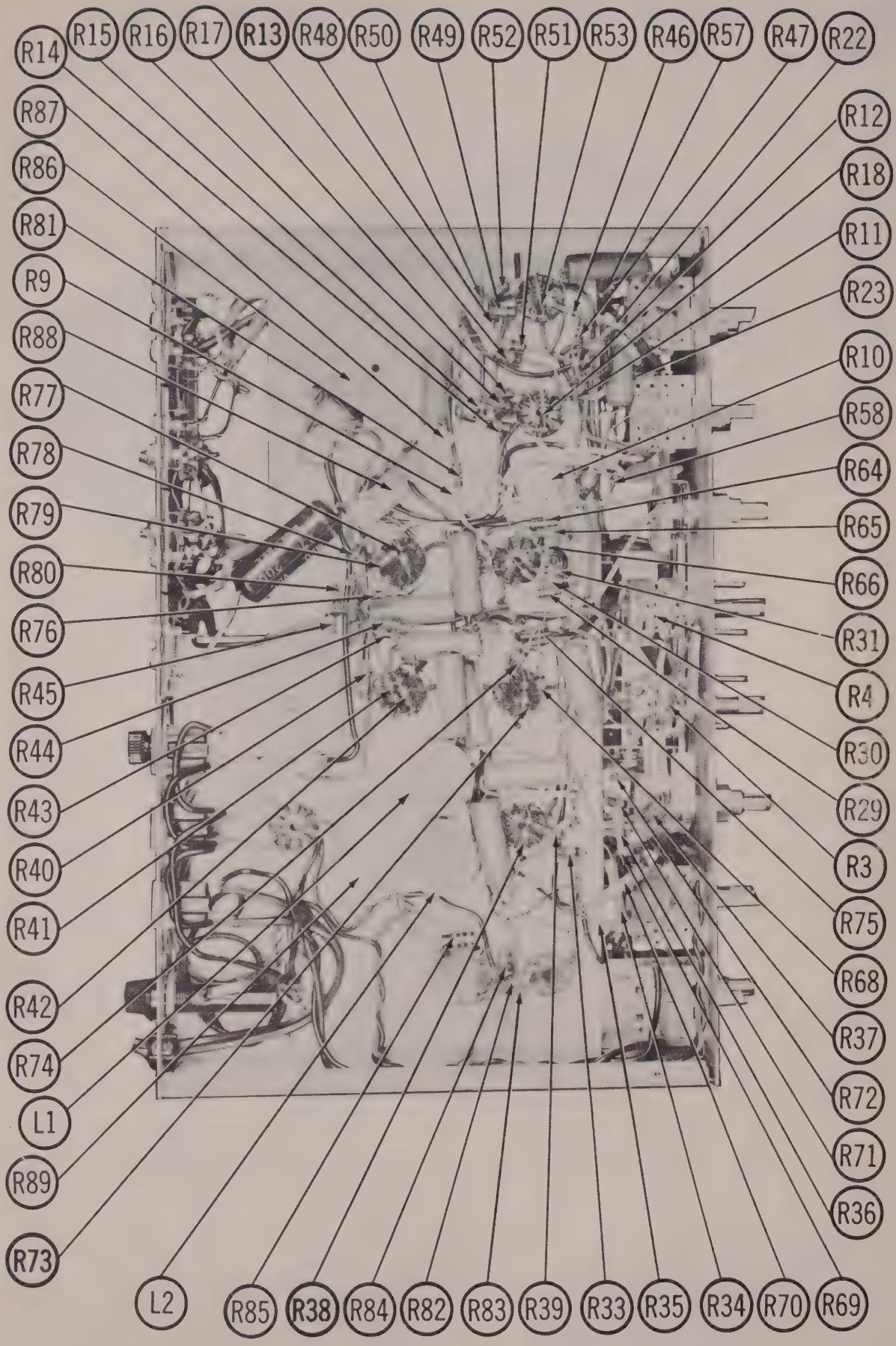
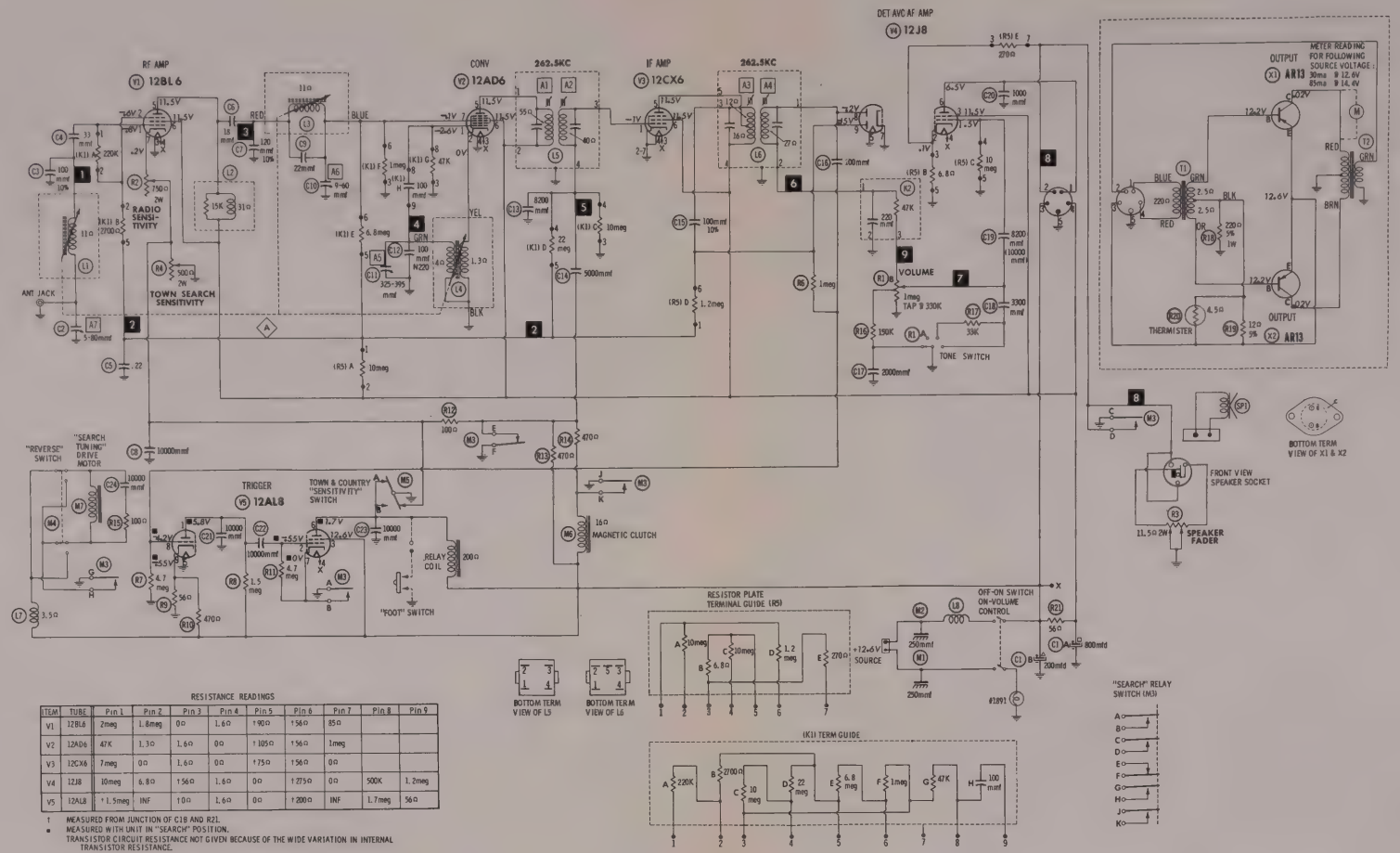
JU597

DATE 3-60 SET 477 FOLDER 6

SET 477 FOLDER 6



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BL6	2meg	1.8meg	0Ω	1.6Ω	†90Ω	†56Ω	85Ω		
V2	12AD6	47K	1.3Ω	1.6Ω	0Ω	†105Ω	†56Ω	1meg		
V3	12CX6	7meg	0Ω	1.6Ω	0Ω	†75Ω	†56Ω	0Ω		
V4	12J8	10meg	6.8Ω	†56Ω	1.6Ω	0Ω	†275Ω	0Ω	500K	1.2meg
V5	12AL8	†1.5meg	INF	†0Ω	1.6Ω	0Ω	†200Ω	INF	1.7meg	56Ω

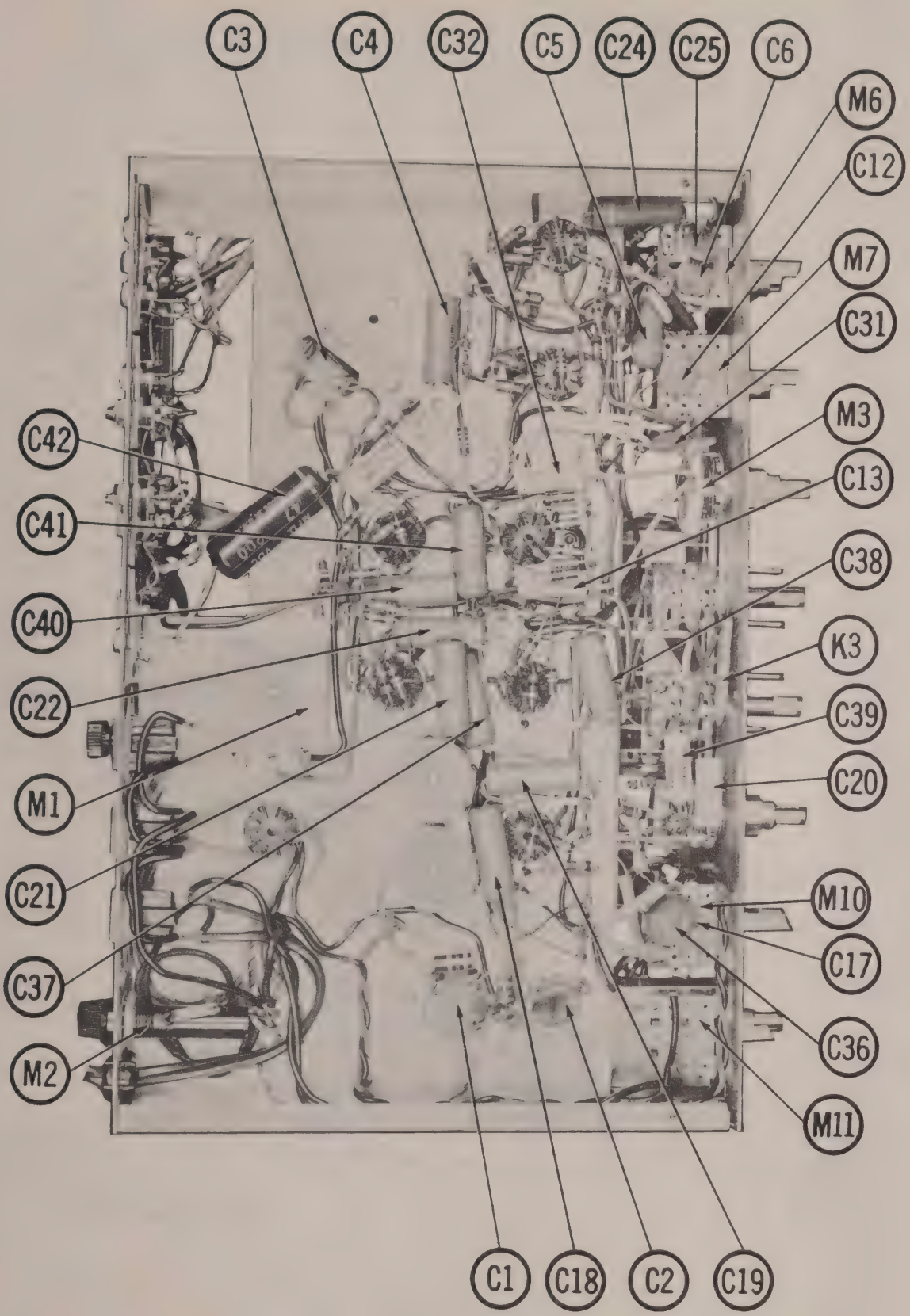
† MEASURED FROM JUNCTION OF C18 AND R21.
■ MEASURED WITH UNIT IN "SEARCH" POSITION.
TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

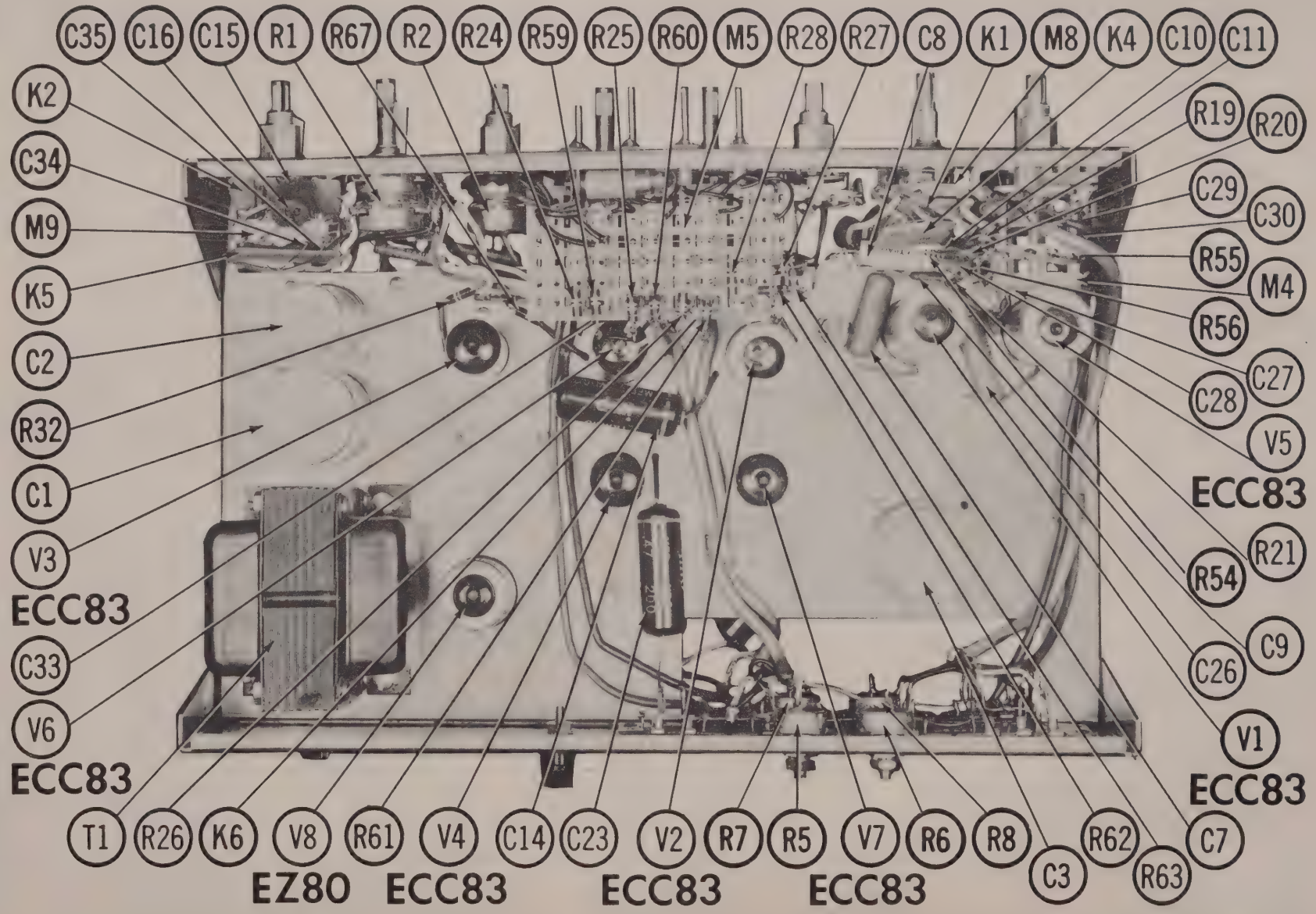
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE
©Howard W. Sams & Co., Inc. 1960

MERCURY MODEL 95PM (89FM-18805-A)



CHASSIS BOTTOM VIEW - CAPACITOR & MISC. IDENT.



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE
V1	Channel A Preamplifier	ECC83 (12AX7, 7025)*
V2	Channel A Cathode Foll. - Channel B Cathode Follower	ECC83 (12AX7) *
V3	Channel A AF Amplifier	ECC83 (12AX7) *
V4	Channel A AF Amplifier - Cathode Follower	ECC83 (12AX7) *
V5	Channel B Preamplifier	ECC83 (12AX7, 7025)*
V6	Channel B AF Amplifier	ECC83 (12AX7) *
V7	Channel B AF Amplifier - Cathode Follower	ECC83 (12AX7) *
V8	Rectifier	EZ80 (6V4) *

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA GROMMES PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450		AFH3-50-5	C0372	FP396.1	TMT-37	TVL-3815.6	
B	■20	450							
C	▲20	450							
C2A	▲10	350		AFH2-47	B0370	FP231	TMD-47	TVL-2750	
B	■10	350							
C3A	▲500	25					TNS-15	TVL-2233	
B	▲500	25					TD-500-25		
C4	10	250		PRS1620	BR1045	TC52	TD-10-250	TVA-1504	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C6	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C7	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C8	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C9	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C10	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C11	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C12	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C13	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C14	.47 200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C15	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C16	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C17	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C18	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C19	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C20	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C21	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C22	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C23	.47 200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C24	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C25	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C26	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C27	.1 200V		P288N-1	DF-104	CUB2P1	2DP-5-474	GEM-201	2TM-P1
C28	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C29	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C30	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C31	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C32	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C33	.47 200V		P288N-47		CUB2P47	2DP-5-474	GEM-201	2TM-P47
C34	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C35	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C36	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C37	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C38	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C39	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C40	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C41	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C42	.47 200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA GROMMES PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K *	1/2	LCK-500KS				■ UE4024	Loudness, Channel A
B	500K *	1/2						Loudness, Channel B
R2A	1meg	1/2	TCK-1MS	B-69	AD47-1meg-S		▲ UE1706	Balance, Channel A
B	1meg	1/2		SR-69	Not Req.			Balance, Channel B
C	Shaft			Not Req.	KSS-3			
R3A	1meg	1/2	TCK-1MS	B-69	AD47-1meg-S		▲ UE1706	Treble, Channel A
B	1meg	1/2		SR-69	Not Req.			Treble, Channel B
C	Shaft			Not Req.	KSS-3			
R4A	1meg	1/2	TCK-1MS	B-69	AD47-1meg-S		▲ UE1706	Bass, Channel A
B	1meg	1/2		SR-69	Not Req.			Bass, Channel B
C	Shaft			Not Req.	KSS-3			
R5	500K	1/2	GH-3794-2A	JL-504	44-500K-W			Level Output, Chan A, Aux. 1
R6	500K	1/2	GH-3794-2A	JL-504	44-500K-W			Level Output, Chan A, Tuner
R7	500K	1/2	GH-3794-2A	JL-504	44-500K-W			Level Output, Chan B, Aux. 1
R8	500K	1/2	GH-3794-2A	JL-504	44-500K-W			Level Output, Chan B, Tuner
R9	500K	1/2	GH-3794-2A	JL-504	44-500K-W			Level Input, Channel A
R10	500K	1/2	GH-3794-2A	JL-504	44-500K-W			Level Input, Channel B

* Taps @ 100K & 200K.
■ "STA-LOC" Equivalent: FB55DT25, RU55DT25, CS3500.
▲ "STA-LOC" Equivalent: FA16L, RU16L, CS3500.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R11	10K	
R12	100K	
R13	100K	
R14	1000Ω	
R15	1meg	
R16	100K	
R17	1000Ω	
R18	18K	
R19	47K	
R20	1meg	
R21	3.3meg	
R22	4.7meg	
R23	47K	
R24	100K	
R25	100K	
R26	100K	
R27	100K	
R28	4.7meg	
R29	2.2meg	
R30	2200Ω	
R31	100K	
R32	100K	
R33	100K	
R34	4700Ω	
R35	4700Ω	
R36	100K	
R37	27K	
R38	1meg	
R39	100K	
R40	470Ω	
R41	1meg	
R42	100K	
R43	1meg	
R44	2200Ω	
R45	100K	
R46	10K	
R47	100K	
R48	100K	
R49	1000Ω	
R50	1meg	
R51	100K	
R52	1000Ω	
R53	18K	
R54	47K	
R55	1meg	
R56	3.3meg	
R57	4.7meg	
R58	47K	
R59	100K	
R60	100K	
R61	100K	
R62	100K	
R63	4.7meg	
R64	2.2meg	
R65	2200Ω	
R66	100K	
R67	100K	
R68	100K	
R69	4700Ω	
R70	4700Ω	
R71	100K	
R72	27K	
R73	1meg	
R74	100K	
R75	470Ω	
R76	1meg	
R77	100K	
R78	1meg	
R79	2200Ω	
R80	100K	
R81	22K	
R82	4700Ω	
R83	4700Ω	
R84	2700Ω 1W	
R85	2700Ω 1W	
R86	5Ω 10W	
R87	40Ω 5W	
R88	40Ω 5W	
R89	2Ω 2W	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA GROMMES PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Tone Choke							220MH
L2	Tone Choke							220MH

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	GROMMES PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .38A	640VCT @ .012A	26V @ .61A	TP-16						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ .85A									

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	GROMMES PART No.	REPLACEMENT DATA
K1	Turnover Compensator	330mmf, 800mmf, 1500mmf, 100K	RO-193	
K2	Loudness Compensator	50mmf, (2) 10000mmf, 22K, 47K, 470K	LC-195	
K3	Tone Compensator	470mmf, (2) 3000mmf, 10K, (3) 68K	TC-190	
K4	Turnover Compensator	330mmf, 800mmf, 1500mmf, 100K	RO-193	
K5	Loudness Compensator	50mmf, (2) 10000mmf, 22K, 47K, 470K	LC-195	
K6	Tone Compensator	470mmf, (2) 3000mmf, 10K, (3) 68K	TC-190	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT (Measured)	GROMMES PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.610A	①	CIB ①	1017 ①	604B ①		① Selenium Type

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			GROMMES PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	½A 250V			312.500 (3AG ½A 250V)	342001	AGC½	HKP

MISCELLANEOUS

ITEM No.	PART NAME	GROMMES PART No.	NOTES
M3	Switch		Function (Rotary Type)
M4	Switch		Turnover (Rotary Type)
M5	Switch		Pushbutton Type Includes Input Switches, Tape-Phono-Mike, Tuner, Aux. 1, Aux. 2
M6	Switch		Lo Filter (Pushbutton Type)
M7	Switch		Hi Filter (Pushbutton Type)
M8	Switch		Roll off (Rotary Type)
M9	Switch		Loudness Contour (Rotary Type)
M10	Switch		Presence (Pushbutton Type)
M11	Switch		Off-On (Pushbutton Type)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

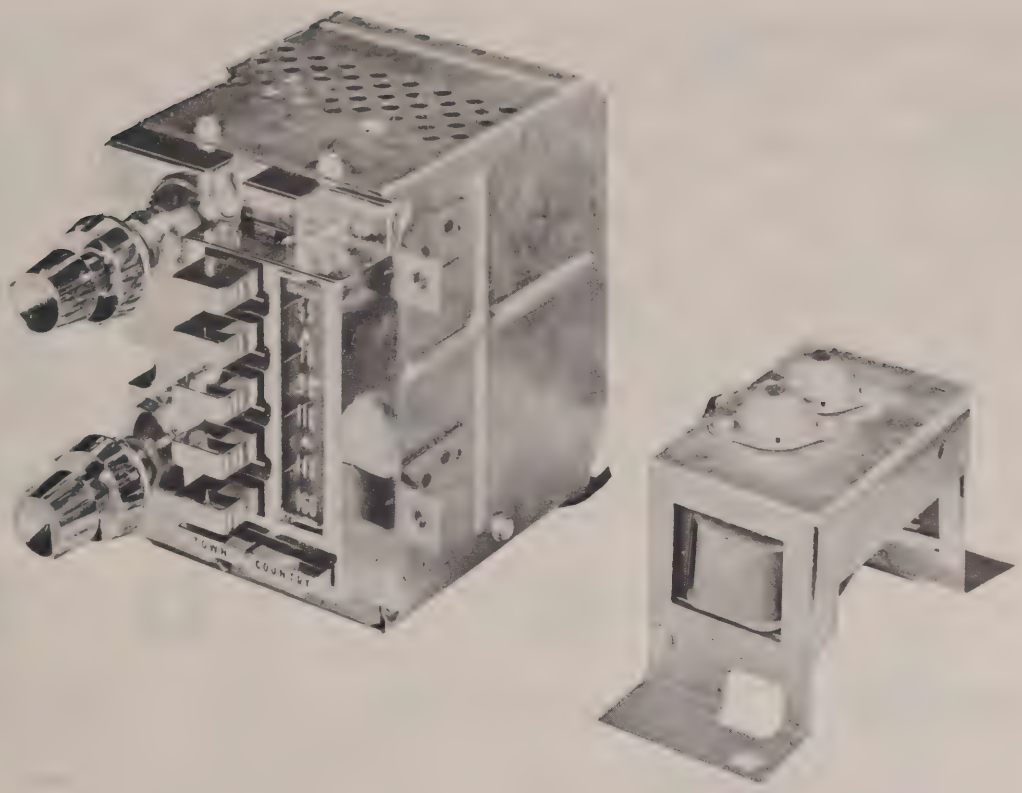
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder with CIRCUITRACE®

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

MERCURY MODEL 95PM (B9FM-18805-A)

MERCURY MODEL
95PM (B9FM-18805-A)



MERCURY MODEL
95PM (B9FM-18805-A)

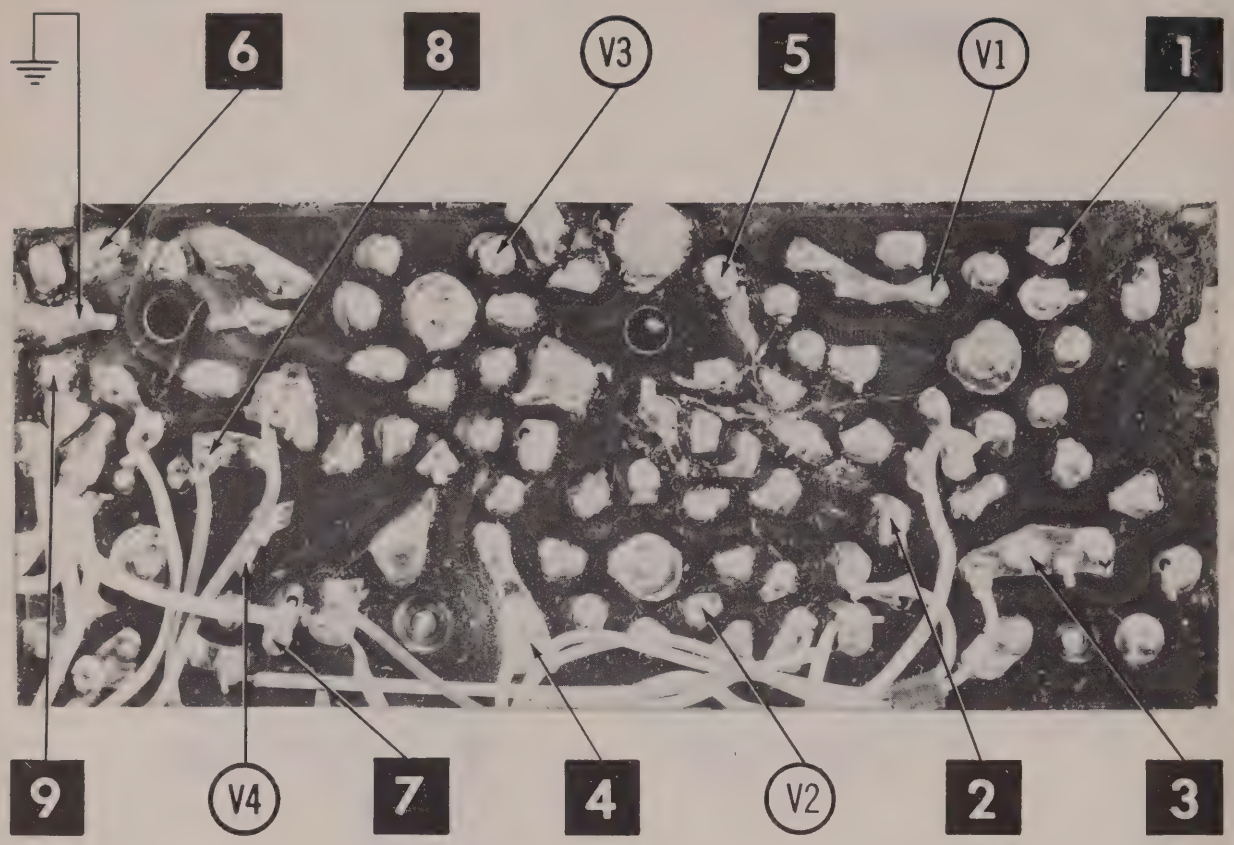
TRADE NAME	Mercury Model 95 PM (B9FM-18805-A) For 1959 Mercury Automobiles
MANUFACTURER	Philco Corp., Tioga & "C" Streets, Philadelphia, Pa.
TYPE SET	Battery Operated 5 Tube Custom Built AM Automobile Receiver With Transistorized Output
POWER SUPPLY	12 Volts DC
RATING	1.5 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	535 – 1610KC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JD520

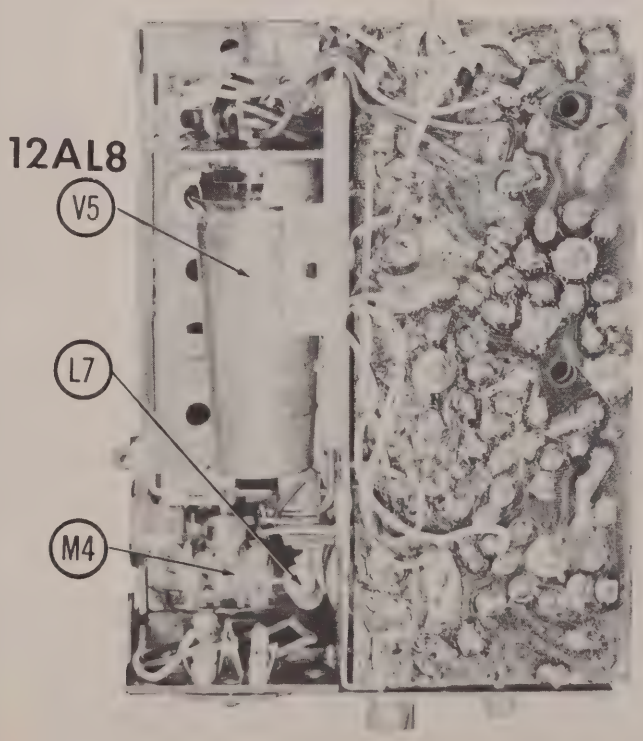
SET 477 FOLDER 7



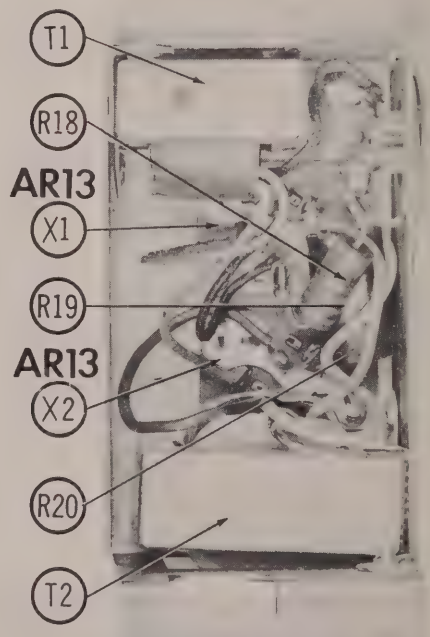
A Howard W. Sams CIRCUITRACE* Photo

PRINTED BOARD

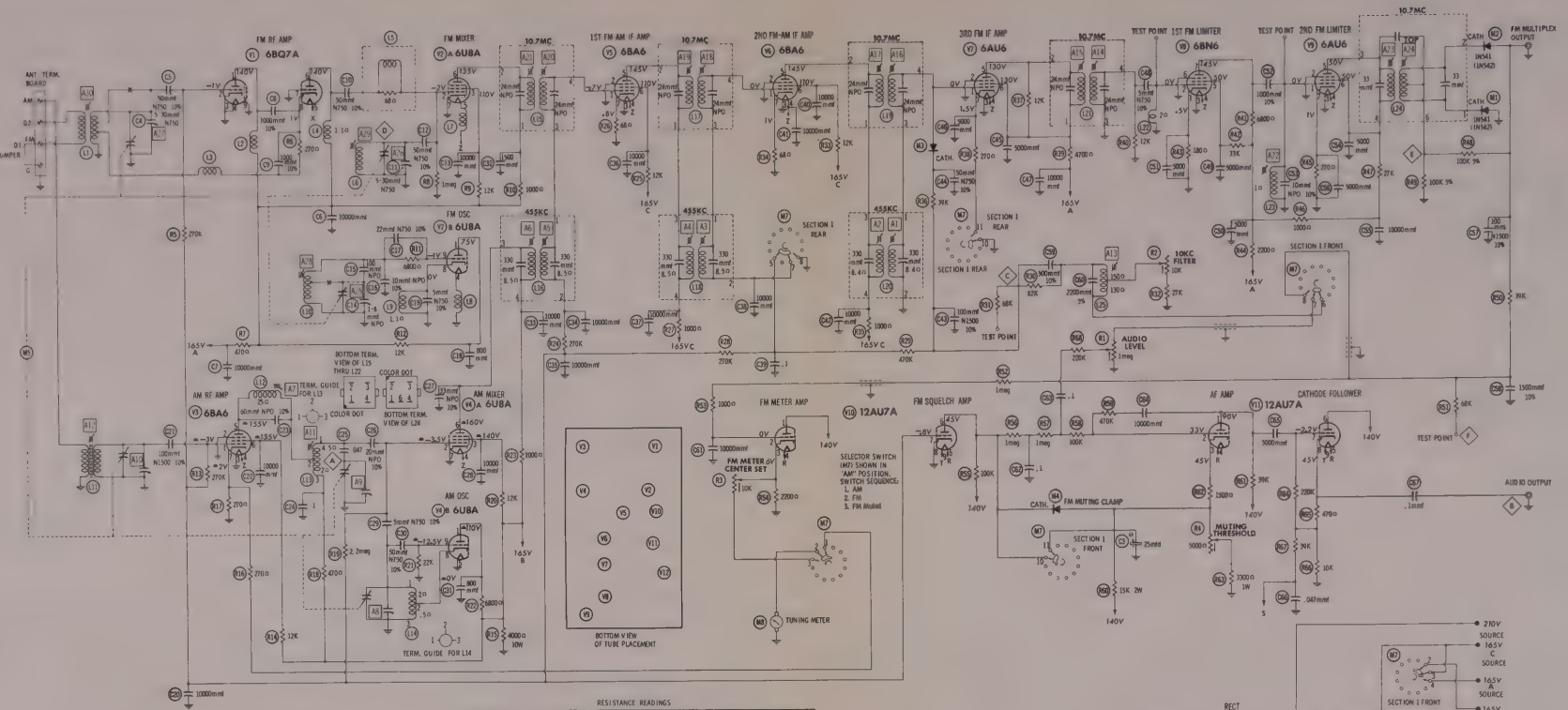
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



CHASSIS — REAR VIEW



POWER CHASSIS
BOTTOM VIEW



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative
4. Line voltage maintained at 117 volts for voltage readings
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BQ7A	†910Ω	1.1meg	0Ω	0Ω	.1Ω	†910Ω	0Ω	270Ω	0Ω
V2	6U8A	†13K	1meg	†13K	0Ω	1Ω	†190Ω	0Ω	1.1Ω	680Ω
V3	6BA6	⁂1.1meg	0Ω	0Ω	.1Ω	†⁂910Ω	⁂12K	⁂ 250Ω		
V4	6U8A	†⁂7200Ω	⁂3meg	†⁂12K	.1Ω	0Ω	†⁂1400Ω	⁂0Ω	⁂.4Ω	⁂ 22K
V5	6BA6	1.1meg	0Ω	0Ω	.1Ω	†1400Ω	†12K	68Ω		
V6	6BA6	8.5Ω ±50K	0Ω	0Ω	.1Ω	†1400Ω	†12K	68Ω		
V7	6AU6	9Ω	0Ω	0Ω	.1Ω	†5100Ω	†5100Ω	270Ω		
V8	6BN6	180Ω	2Ω	0Ω	1Ω	†35K	0Ω	†9400Ω		
V9	6AU6	1Ω	0Ω	0Ω	.1Ω	†30K	†30K	270Ω		
V10	12AU7A	†1900Ω	1.2meg	1800Ω	49K	49K	†100K	800K	0Ω	49K
V11	12AU7A	†40K	†2.1meg	8000Ω	49K	49K	†1900Ω	230K	10K	49K
V12	EZ81	60Ω	NC	¶	.1Ω	0Ω	NC	58Ω	NC	NC

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT. ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
⁂ MEASURED IN "AM" POSITION.
† MEASURED FROM PIN 3 OF V12.
NC NO CONNECTION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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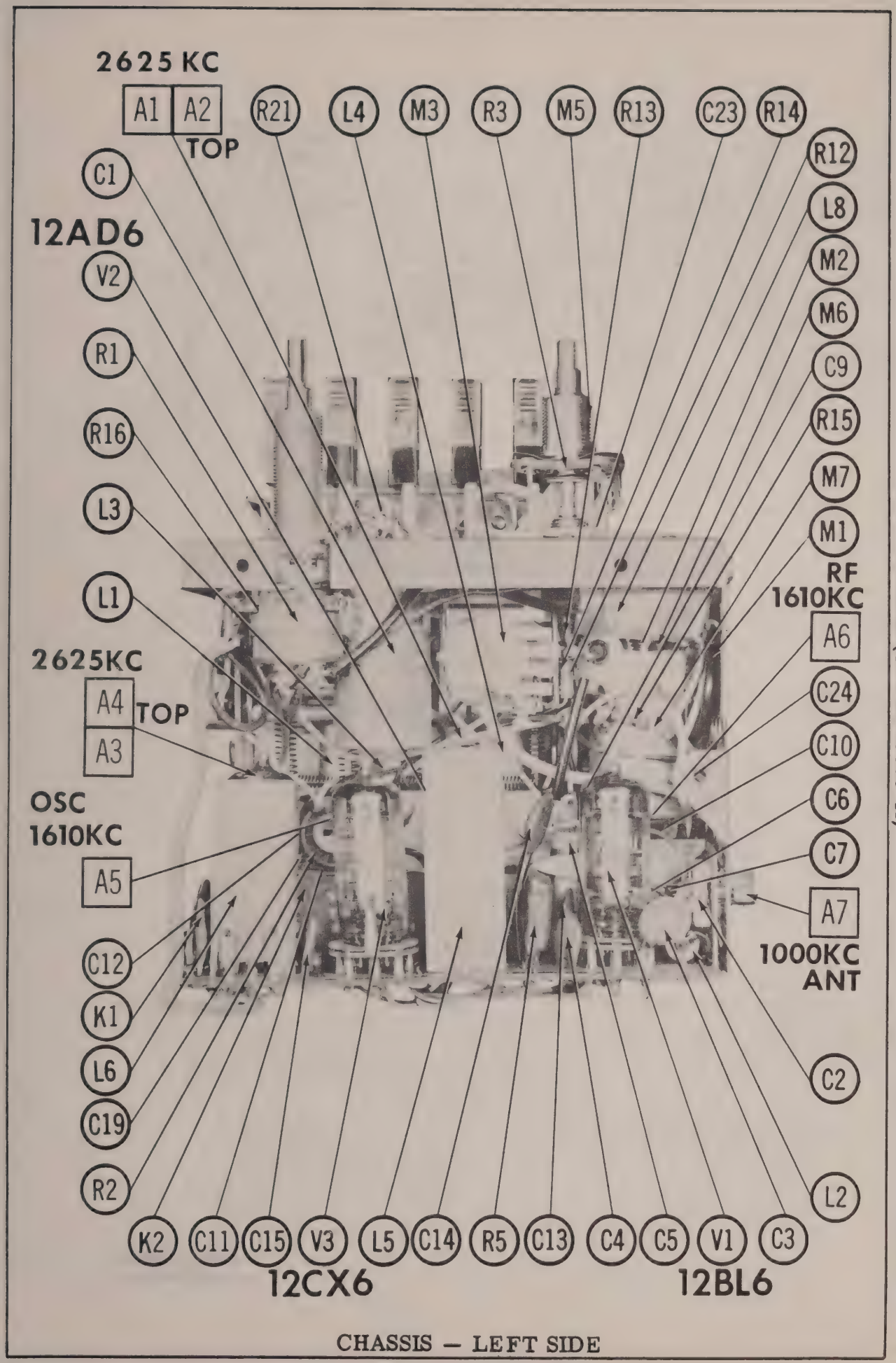
PILOT
MODEL FA-670



CHASSIS — LEFT SIDE

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
A1 thru A4.....GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A5, A6.....GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.		High side thru .05mfd to pin 7(grid) of Converter. Low side to chassis.	262.5KC (400∿ Mod.)	High end stop.	DC probe to point (A). Common to chassis.	A1, A2, A3	Adjust for maximum deflection
2.		"	"	"	"	A4	Adjust for MINIMUM deflection.
3.		To antenna receptacle thru dummy (Fig. 1.)	1610KC	"	Output meter across voice coil.	A5, A6	Adjust for maximum deflection.
4.		"	1000KC	1000KC	"	A7	"
5.	With radio installed in car and antenna fully extended, tune in a weak station near 1000KC and adjust A7 for maximum output.						

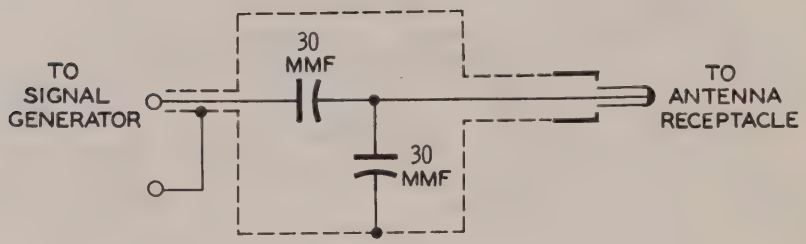


FIG. 1

ADJUSTMENTS

PUSHBUTTON ADJUSTMENT

1. Pull button out.
2. Tune manually to desired station.
3. Press button in firmly.
4. Repeat for remaining buttons.

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆		GENERAL ELECTRIC ◆		◆ RAYTHEON ◆		SYLVANIA ◆
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	RF Amplifier	12BL6	V4	Det-AVC-AF Amp.	12J8
V2	Converter	12AD6	V5	Trigger	12AL8
V3	IF Amplifier	12CX6			

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	AR-13	Output	LT-52				PNP Matched
X2	AR-13	Output	LT-52				PNP Pair

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■800	16	61-0086-11						
B	▲200	16							

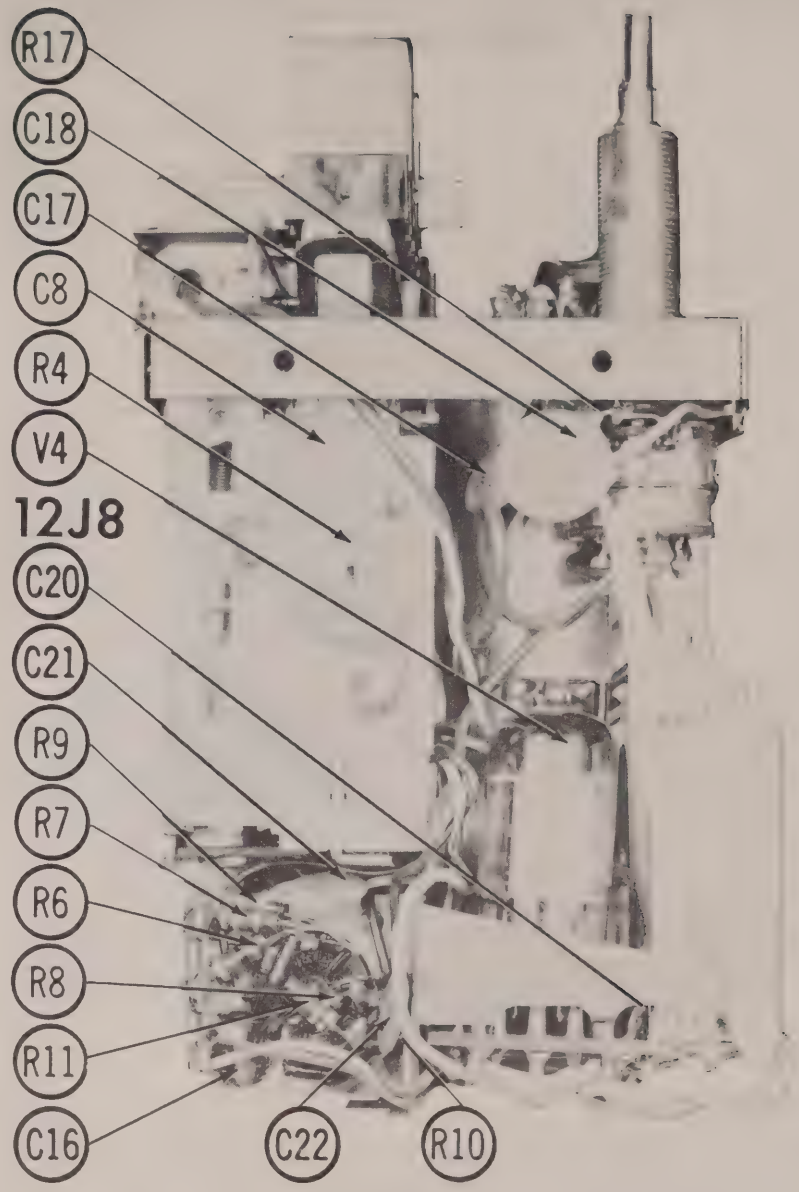
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	5-80	#31-6533-1				462		
C3	100 10%		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C4	33		DI-33	DD-330	L10Q33	CCD-330	GP433	10TS-Q33
C5	.22 200V		P288N-22		CUB2P22	2DP-4-224	GEM-2022	2TM-P22
C6	18		DI-18	DD-180	L10Q18	CCD-180	GP418	10TS-Q18
C7	120 10%		DI-120	DD-121	L10T12	CCD-121	GP312	10TS-T12
C8	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C9	22		DI-22	DD-220	L10Q22	CCD-220	GP322	10TS-Q22
C10	9-60	#31-6502-10						
C11	325-395	#31-6532-6						
C12	100 N220	#30-1263-45				*		10TCR-T10
C13	8200		DAC-26	DD-822	HVE16D8	CCD-822	UAC-280	BL-D80
C14	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C15	100 10%		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C16	100		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C17	2000		BPD-002	DD-202	BYA10D2	CCD-202	GP220	5HK-D20
C18	3300		BPD-0033	DD-332	BYA10D33	CCD-332	GP233	5HK-D33
C19	8200	(10000mmf) ◆	DAC-26	DD-822	HVE16D8	CCD-822	UAC-280	BL-D80
C20	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C21	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C22	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C23	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C24	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10

Philco Part Number.
◆ Alternate Value.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	Switch		33-5570-3					Tone
B	1meg	½						Volume
	300K tap							
C	Switch							Power Off-On
R2	750Ω	2(WW)	33-5591-13					Radio Sensitivity
R3	500Ω	2(WW)	33-5591-12		39-500	112-500	FL-500	Town Search Sensitivity
R4	11.5Ω	2(WW)	33-5576-8					Speaker Fader

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R5A	10meg	
B	1.2meg	
C	10meg	
D	6.8Ω	#30-6527-2
E	270Ω	
R6	1meg	
R7	4.7meg	

ITEM No.	RATING	REMARKS
R8	1.5meg	
R9	56Ω	
R10	470Ω	
R11	4.7meg	
R12	100Ω	
R13	470Ω	
R14	470Ω	

ITEM No.	RATING	REMARKS
R15	100Ω	
R16	150K	
R17	33K	
R18	220Ω 5% 1W	
R19	12Ω 5%	
R20	4.5Ω	#33-3343-16
R21	56Ω	

Philco Part Number.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	PHILCO PART No.	REPLACEMENT DATA
K1	RF Amp. & Converter Network	100mmf, 2700Ω, 47K, 220K, 1meg, 6.8meg, 10meg, 22meg	30-6528-1	
K2	2nd IF Filter	220mmf, 47K	30-6036-1	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		PHILCO PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Ant. Coil	32-4730-31						
L2	RF Choke	32-4480-37①	19-1037 *	19-1037 *	BC-513 *	4652 *		1MH
L3	RF Coil	32-4730-32						
L4	Osc. Coil	32-4730-33						
L5	Input IF	32-4770-2	16-6756	16-6756	BC-344	13-PH1		
L6	Output IF	32-4772-1						
L7	RF Choke	32-4422-24	19-1008	19-1008		4609		5.6uh②
L8	"A" Lead Choke	32-4720-4						265uh

* Parallel With 15K Resistor.
① Wound On 15K Resistor.
② IRC Part #CL-1.

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	PHILCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	6.5	1	32-8868-1						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	PHILCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	55Ω CT	3-4Ω	32-8867-1							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MERCURY PART No.	QUAM PART No.	
SP1	6"x 9"	PM	3-4Ω	FDT-18808-A①	69A2	① Available thru Mercury dealer

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M1	Spark Plate	38-1254-1	Pilot Light Lead (250mmf)
M2	Spark Plate	38-1254-1	"A" Lead (250mmf)
M3	Switch	42-4036	Search
M4	Switch	76-115222-1	Motor Reversing
M5	Switch	78-10737-1	Town-Country Sensitivity
M6	Relay	78-11519-1	Magnetic Clutch
M7	Motor	78-10962-1	Search Tune Drive
	Printed Board	54-6939-1	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Pushbutton Ass'y.	76-10783-1	Tune
Pushbutton Ass'y.	76-10783-2	Town
Pushbutton Ass'y.	76-10783-3	Country
Pointer Ass'y.	76-11513-8	
Dial Scale	54-6774	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8861

PHOTOFACT® Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

OLYMPIC MODEL 552

OLYMPIC MODEL 552

OLYMPIC MODEL 552

TRADE NAME	Olympic Model 552
MANUFACTURER	Olympic Radio & TV Inc., 34-01 38th Ave., Long Island City 1, N. Y.
TYPE SET	AC-DC Operated 5 Tube AM Receiver
POWER SUPPLY	110-120 Volts AC-DC
RATING	26 Watts, .28 Amp. @117 Volts AC
TUNING RANGE—BROADCAST	540-1650KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
A1 thru A4..... GENERAL CEMENT #5097, 8727
WALSCO #2515
A5, A6..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to antenna stator lug of tuning gang. Low side to chassis.	455KC (400∿ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.		"	1650KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JG517

SET 477 FOLDER 8

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆		GENERAL ELECTRIC ◆	◆ RAYTHEON ◆		SYLVANIA ◆
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Converter	12BE6	V4	Output	50C5
V2	IF Amplifier	12BA6	V5	Rectifier	35W4
V3	Det. -AVC-AF Amp.	12AV6			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	70	150	150-145	PRS2230	BBRD8415	WD220	TDLD-10	TVA-2460	
B	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	12 N075 2%	Note 1						
C3	.05 200V		P288N-05	DD-503	CUB2S5	4DP-3-503	GEM-415	2TM-S5
C4	220 10%		1469-00022	DD-221	22R5T22	CM-20B-221K	MCB240	MS-322
C5	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C6	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S5
C7	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	500K	½	120-162B	B-60-S	A47-1meg-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US-26	Power Off-On

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	2.2meg	
R3	22K	
R4	2.2meg	

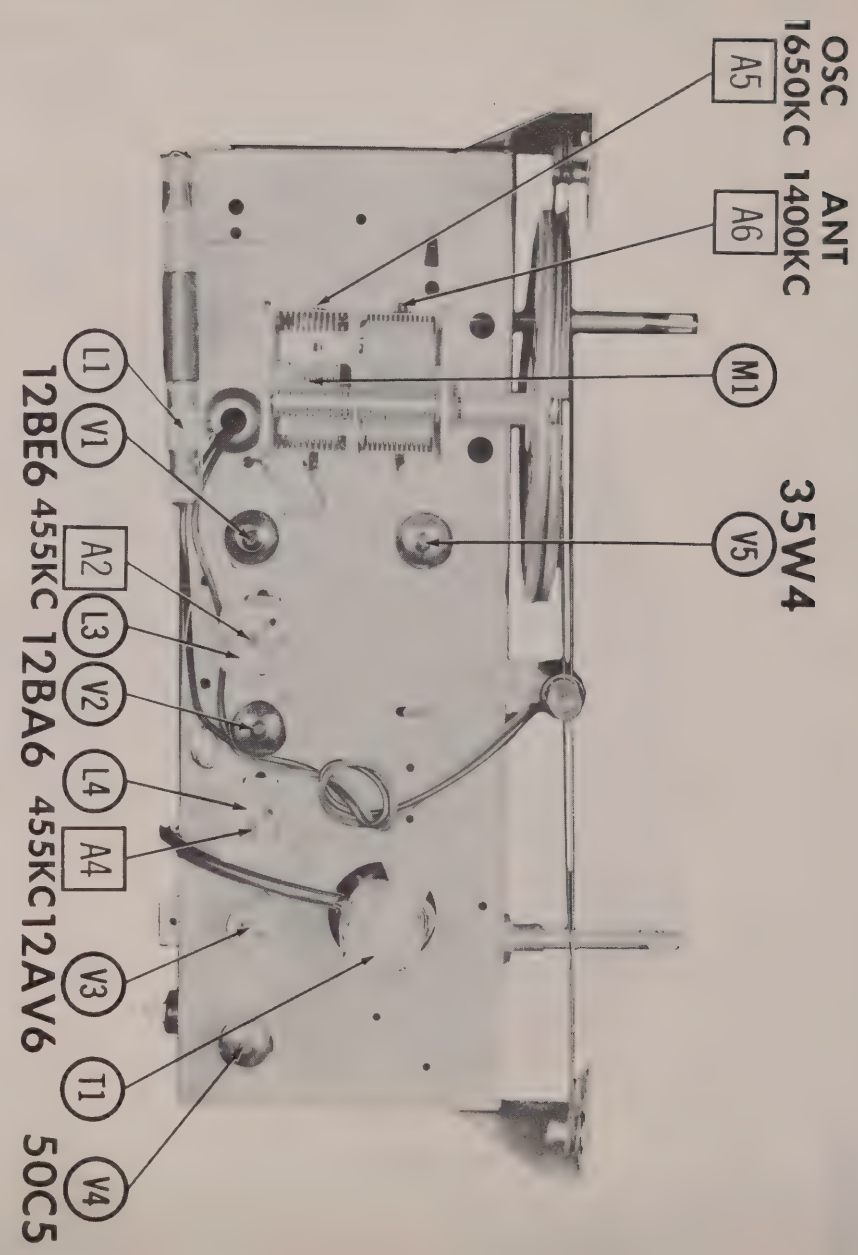
ITEM No.	RATING	REMARKS
R5	150Ω	
R6	150Ω	
R7	1500Ω 1W	

ITEM No.	RATING	REMARKS
R8	330Ω 1W	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		OLYMPIC PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	132-146						
L2	Osc. Coil	136-145			BC-393	69-OSC		
L3	Input IF	130-114	16-6758	16-6758	BC-352	12-C1	RF-1	
L4	Output IF	130-114	16-6758	16-6758	BC-353	12-C2	RF-2	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2500Ω	3-4Ω	138-140	24S53	A3025	AU-605	A-3332	24S53	S-12X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	OLYMPIC PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	175-145A	4A07	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	OLYMPIC PART No.	REPLACEMENT DATA
K1	Audio Coupling	250mmf (Total), 220mmf, 5000mmf, 5000mmf, 470K, 470K, 6.8meg	166-111	Aerovox PA-113-2 Centralab PC-151 Cornell-Dubilier 116TM2 Mallory MS-107 Sprague DT-2

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M1	Tuning Cap.	160-163A	2 Gang, Ant. 30—420mmf, Osc. 18—162mmf

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

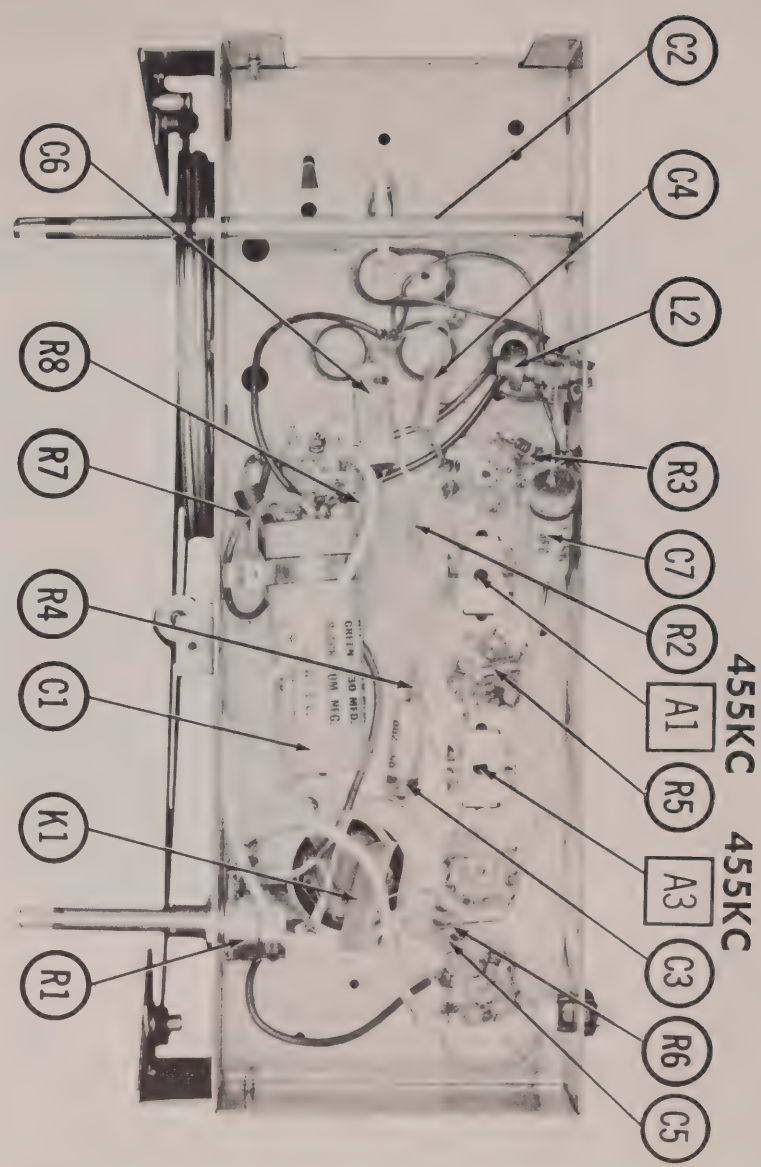
NAME	PART NO.	DESCRIPTION
Knob	220-182	Tuning, Volume
Cabinet	210-168	Red, Tan, or Turquoise (Specify Color)

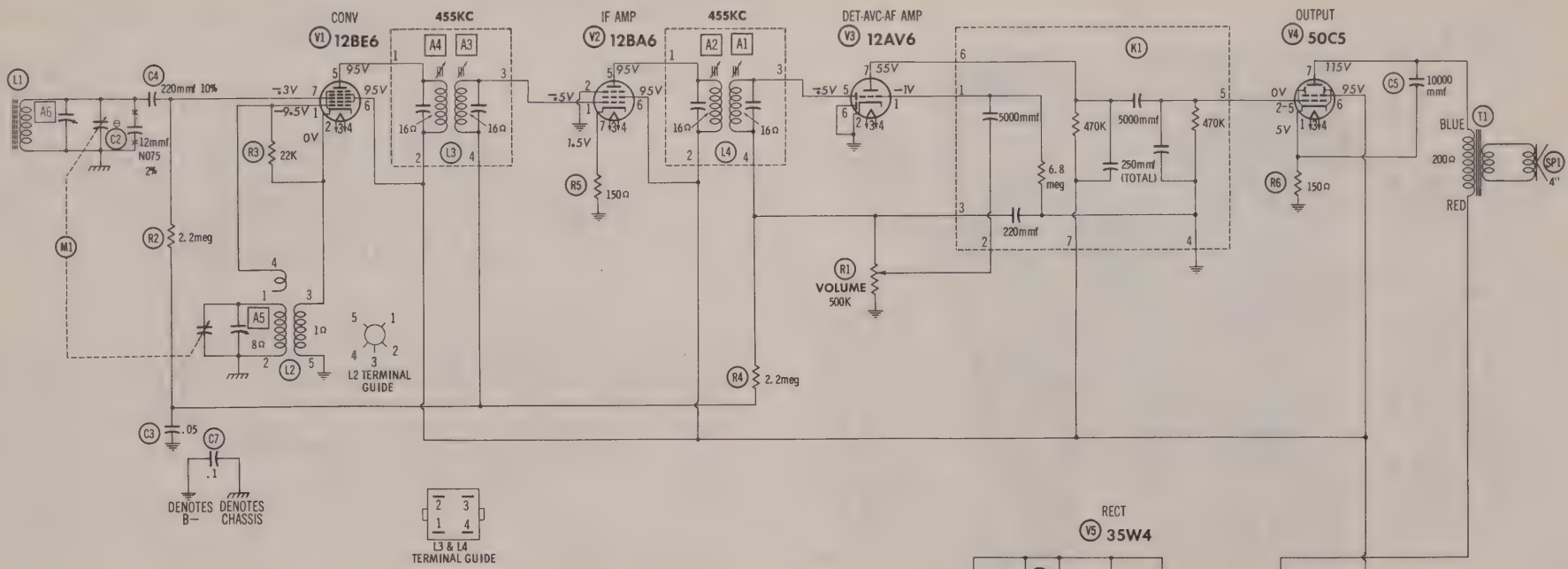
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

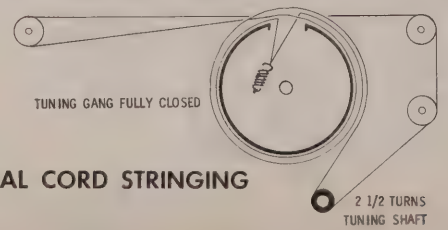
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	1.2Ω	12Ω	24Ω	†1500Ω	†1500Ω	4.9meg
V2	12BA6	2.7meg	0Ω	24Ω	36Ω	†1500Ω	†1500Ω	150Ω
V3	12AV6	6.8meg	0Ω	0Ω	12Ω	500K	0Ω	†470K
V4	50C5	150Ω	470K	86Ω	36Ω	470K	†1500Ω	†200Ω
V5	35W4	TP	NC	86Ω	120Ω	115Ω	115Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.
TP TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.



DIAL CORD STRINGING

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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OLYMPIC MODEL 552

PHOTOFACT® Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

**PENTRON MODEL
XP-60, XP-60S**

PENTRON MODEL
XP-60, XP-60S

PENTRON MODEL
XP-60, XP-60S

GENERAL INFORMATION

Pentron Models XP-60 and XP-60S tape recorders are similar in their basis electrical and mechanical construction. The major difference between these recorders is that a stereophonic preamplifier has been added in the Model XP-60S. The Model XP-60S also has a different play-record head, which will accomodate stereophonic tapes.

The Models XP-60 and XP-60S will record and play dual-track monaural recordings. The Model XP-60S will play 2 track or 4 track stereophonic recordings. Both models will record and play at either 3 3/4 or 7 1/2 ips.

The Models XP-60 and XP-60S must be operated from a 60-cycle, 105- to 120-volt AC supply only. Before connecting to your line supply, make sure it agrees with the foregoing.

Manufactured by:

The Pentron Corp.
777 S. Tripp Ave.
Chicago 24, Illinois

This material compiled and published by

HOWARD W. SAMS & CO., INC., INDIANAPOLIS 6, INDIANA

JQ628

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SPECIFICATIONS

SPEEDS:
Record and playback, 7 1/2 and 3 3/4 ips.

FAST FORWARD:
Complete wind of a 7 inch reel in 80 seconds.

REWIND:
Complete rewind of a 7 inch reel in 80 seconds.

FLUTTER:
Under 0.3% at 7 1/2 ips.

MOTOR:
Heavy-duty, 4-pole, shaded pole, dynamically and individually balanced.

FREQUENCY RESPONSE:
40-15,000 cps ± 3db @ 7 1/2 ips; 40-12,500 cps ± 3db @ 3 3/4 ips.

SIGNAL-TO-NOISE RATIO:
-52db.

RECORD-LEVEL INDICATOR:
Electron beam.

INPUT JACKS AND IMPEDANCES:
Mic. input, 1 meg; Radio input, 500K.

OUTPUT JACKS AND IMPEDANCES:
Amp. output (Cathode-follower type), 1K to 2K; Speaker output, 8 ohms; Stereo output (Model XP-60S only), high impedance.

RECORD-PLAY HEAD:
Model XP-60, half-track monaural; Model XP-60S, quarter-track stereo (in-line).

ERASE HEAD:
Double-gap erase head.

POWER CONSUMPTION:
80 watts full load.

DIMENSIONS:
12 1/4" wide, 12 3/4" deep, 6 1/2" high.

WEIGHT:
Approximately 18 pounds.

FUNCTIONS OF CONTROLS, INDICATORS, AND SWITCHES

Speed Control

Make sure power is on. With tape threaded, speed control switch can be moved to the left for 7 1/2" per second or, to the right for 3 3/4" per second in any push button position. Make sure the switch "CLICKS" to insure proper engagement. The action that takes place during a speed change is as follows:

Capstan drive belt (42) rides between the forked end of speed change fork (55). When the Speed Change button is moved to the left, the forked end of speed change fork (55) pivots upward. This lifts capstan drive belt (42) high enough to be picked up by an "ear" on motor drive pulley (41). The "ear", in turn, places capstan drive belt (42) in the middle pulley of motor pulley assembly (41), resulting in a tape speed of 7 1/2 ips.

When the Speed Change button is moved to the right, the forked end of speed change fork (55) pivots downward. This lowers capstan drive belt (42) enough to contact one of the "ears" on motor pulley (41). This "ear", in turn, places capstan drive belt (42) in the bottom pulley of motor pulley assembly (41), resulting in a tape speed of 3 3/4 ips.

When the Speed Change button is moved to the left for the 7 1/2-ips tape speed, speed change fork (55) contacts and closes equalizer switch (57) in order to obtain the correct equalization for the 7 1/2-ips tape speed.

Push Buttons

Mechanical and electrical functions relating to the Play and Record operations are controlled by the push buttons. In addition to starting or stopping the tape, the Play, Record, and Stop push buttons switch the proper electrical circuits in or out when the buttons are depressed. The mechanical functions for wind and rewind are controlled by the Wind and Rewind push buttons. The following mechanical action takes place as each push button is depressed:

NOTE: This sequence of push-button operation originates with the Stop button depressed.

Play Button

1. Depressing the Play button releases the Stop button. When the Stop button is released, tension on brake spring (11) is relieved, allowing brake release spring (10) to pull brake rollers (3) away from reel rests (12). Tension on cutoff switch link (77) is also relieved, allowing the arm on cutoff switch bracket (75) to rest against the tape. This action allows cutoff switch (74) to break contact if the tape spills or breaks.

2. Pressure roller spring (64) pulls head mounting bracket and guide assembly (104) forward, allowing the heads to contact the pressure pads and pressure roller (105) to contact the capstan.

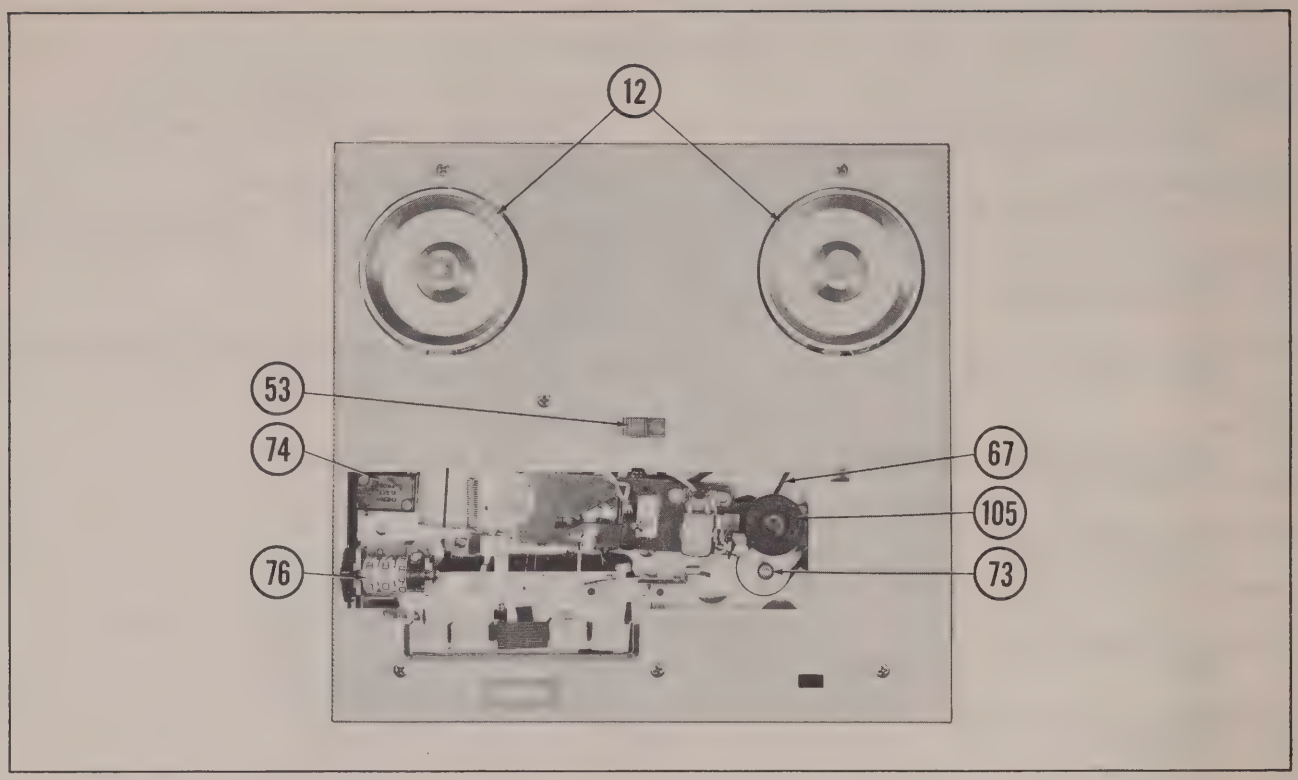


Figure 1. Top View Of Mechanism With Top Casting Removed.

3. Tension applied to take-up spring (90) pivots take-up bracket (93). Take-up bracket (93), in turn, moves take-up pulley assembly (69) against right-hand reel rest (12) to provide tape take-up.

4. Tension applied to drag arm spring (40) pivots drag arm (39) against left-hand reel rest (12). This action applies a slight drag to left-hand reel rest (12). The drag prevents the tape from overruning as it is pulled from the supply reel.

Record Button

1. Depressing the Record button releases the Stop button. When the Stop button is released, tension on brake spring (11) is relieved, allowing brake release spring (10) to pull brake rollers (3) away from reel rests (12). Tension on cutoff switch link (77) is also relieved, allowing the arm on cutoff switch bracket (75) to rest against the tape. This action allows cutoff switch (74) to break contact if the tape spills or breaks.

2. Tension applied to record spring (79) pivots switch actuator arm (102). Switch actuator arm (102), in turn, switches the amplifier Play-Record switch from Play to Record. In all other push-button positions, the amplifier Play-Record switch remains in the Play position.

Wind Button

1. Depressing the Wind button releases the Stop button. When the Stop button is released, tension on brake spring (11) is relieved, allowing brake release spring (10) to pull brake rollers (3) away from reel rests (12). Tension on cutoff switch link (77) is also relieved, allowing the arm on cutoff switch bracket (75) to rest against the tape. This allows cutoff switch (74) to break contact if the tape spills or breaks.

2. Tension applied to fast forward spring (36) pivots rocker arm (34). Rocker arm (34), in turn, pivots traverse link (29) and traverse pulley (25) toward right-hand reel rest (12). Fast traverse belt (31), which drives traverse pulley (25) from motor pulley (41), contacts right-hand reel rest (12) to drive the tape at a rapid forward speed.

Rewind Button

1. Depressing the Rewind button releases the Stop button. When the Stop button is released, tension on brake spring (11) is relieved, allowing brake release spring (10) to pull brake rollers (3) away from reel rests (12). Tension on cutoff switch link (77) is also relieved, allowing the arm on cutoff switch bracket (75) to rest against the tape. This allows cutoff switch (74) to break contact if the tape spills or breaks.

2. Tension applied to rewind spring (35) pivots rocker arm (34). Rocker arm (34), in turn, pivots traverse link (29) and traverse pulley (25) toward left-hand reel rest (12). Fast traverse belt (31) contacts rewind idler wheel (16). Rewind idler wheel (16), in turn, drives left-hand reel rest (12) at a rapid rewind speed.

Volume Control

Turning the Volume control clockwise increases the volume level for both record and playback; turning it counterclockwise decreases the volume level.

Tone Control On-Off Switch

The Tone control varies the relative strength of the bass and treble frequencies during playback only; it has no effect on the tone during a recording. The first few degrees of rotation operate the On-Off switch, which controls the power to both the motor and the amplifier.

Automatic Index Counter

Automatic index counter (76) provides a means for locating recorded material anywhere on the tape. Set the counter to zero at the beginning of a reel by rotating the Reset knob. Counter belt (13), which is connected to left-hand reel rest (12), drives the counter.

Cutoff Switch

Cutoff switch (74) is located to the left of the head assembly. The tape falls between tape guide bracket (80) and the arm on cutoff switch bracket (75). Thus, when the end of a reel of tape is reached, or if the tape should spill or break, the arm on cutoff switch bracket (75) moves into tape guide bracket (80). This action opens cutoff switch (74), and shuts off the drive mechanism.

DISASSEMBLY INSTRUCTIONS

To Remove Unit From Case

1. Remove the six screws from bottom of case.

2. Remove the screw from rear of case.

3. Remove push-on type Volume and Tone control knobs.

4. Remove hex nuts from control shafts.

5. Remove the screw from right side of case.

6. Remove the screw from left side of front grille.

7. Remove grille from case.

8. Set case on its side and carefully work mechanism halfway out of case.

9. Unplug one lead from each speaker. Remove mechanism from case.

To Remove Top Cover Casting And Top Plate

To gain access to the head assembly, place both hands on the grey plastic top casting and press in gently with both thumbs. Raise the front edge and slide the entire casting forward. To replace the casting, repeat this procedure, inserting the edge nearest the reel rests first.

To remove the top plate, remove the six Phillips head screws that mount the plate. Lift the top plate straight up and off the mechanism.

OPERATING INSTRUCTIONS

Tape Loading And Threading

Place an empty reel on the right-hand reel rest, making sure the three fins enter the reel slots. Place a full reel of standard "A" tape on the left-hand reel rest, with the shiny side of the tape facing the operator. Stretch tape in line with threading slot, and lower it into place. Attach end of tape to take-up reel and turn the reel by hand several times until the tape has been secured to the reel. Tape can only be loaded with the STOP button depressed.

Turning On The Amplifier And Motor

To supply power to the amplifier and motor, turn the Tone control to the right. Allow the amplifier to warm up for approximately thirty seconds before proceeding to record or playback.

Selecting Speeds

With power on and tape threaded, the Speed Control button can be moved to the left for 7 1/2-ips tape speed or to the right for 3 3/4-ips tape speed while the recorder is in any push-button position.

To Record From A Microphone

1. Insert the microphone plug into the Mic. jack.

2. Set the record level. This can be done before tape movement is started, by depressing the Record push button and adjusting the Volume control for proper response from the Electronic Beam. The proper recording level is the point where the loudest sounds cause the Electronic Beam to barely close.

3. TO RECORD ON THE TAPE, DEPRESS THE RECORD AND PLAY BUTTON SIMULTANEOUSLY. When finished recording, depress the Stop button.

To Record From Radio, TV, Or Phonograph

1. Connect the output signal from the radio, tuner, TV, or phonograph, to the Radio input jack on the recorder.

2. Proceed with the recording as described in Steps 2 and 3 of "To Record From A Microphone."

To Play A Recording

1. Rewind the tape by depressing the Rewind button.

2. When the tape is rewound to the desired point, depress the Stop button.

3. Depress the Play button and adjust the Volume and Tone controls for the desired listening level.

To Play Stereo Tapes (Models XP-60S Only)

The Model XP-60S has two head positions for playback: 2T (designates two-track) and 4T (designates four-track). Be certain that the recorder head position corresponds with the tape to be played.

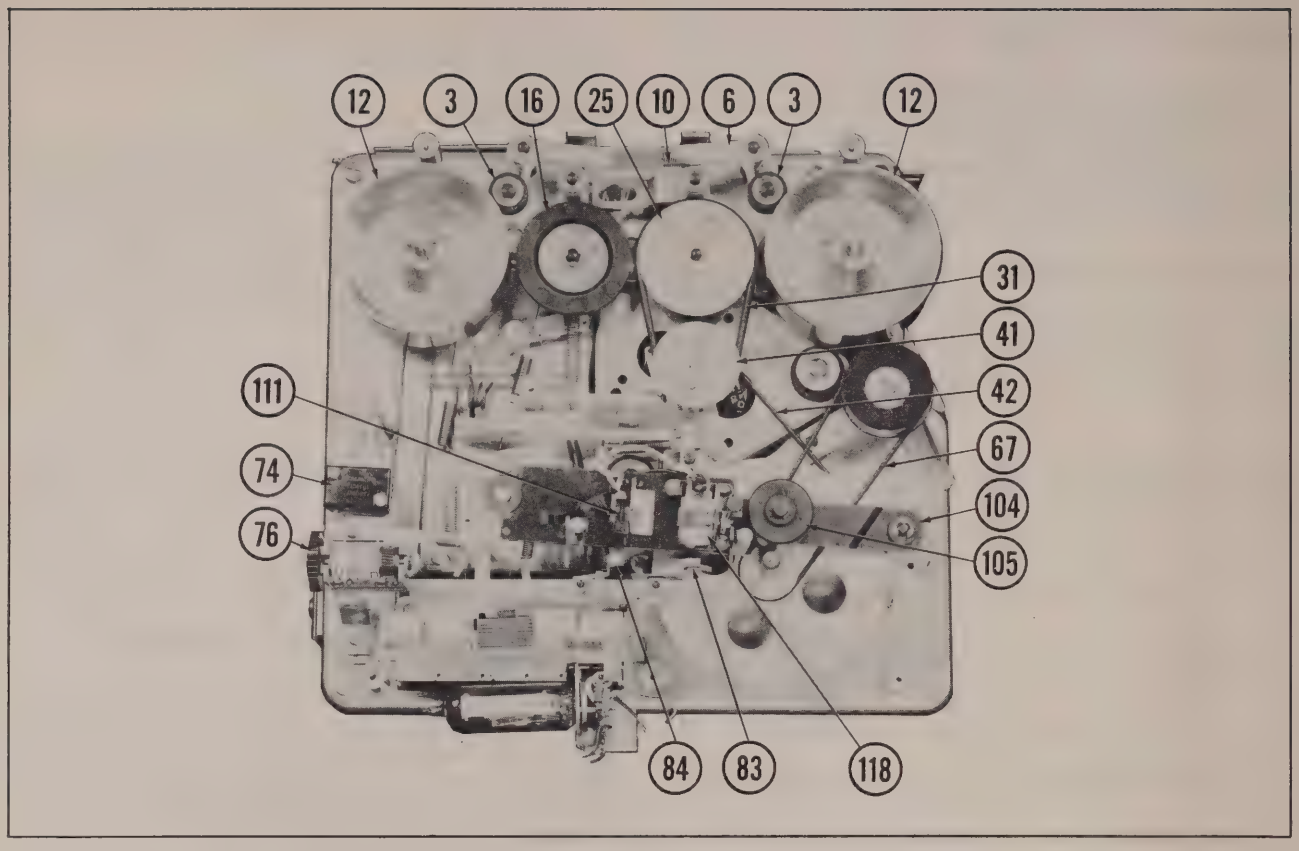


Figure 2. Top View Of Mechanism With Top Plate Removed.

1. Use the shielded cable provided. Feed the output from the Stereo Amp. jack on the rear deck, to an external amplifier-speaker system.

2. Depress the Play button.

3. Position the head to correspond with the tape being played, by inserting a small screw driver (approximately 1/8-inch blade) through the hole in the head cover. Turn the screw in the desired direction, as indicated by the arrow on the head cover. Depress the Play button before changing from 4T to 2T or vice versa.

4. Adjust the Model XP-60S and external amplifier Volume and Tone controls for the desired listening level.

ADJUSTMENTS

Take-Up Adjustment

The rpm of the take-up reel changes considerably as the diameter of the reel of tape increases. Therefore, a slipping clutch is used to drive the take-up reel at the constantly varying speeds required.

This clutch consists of take-up reel pulley (66), which is driven at a constant speed by the take-up belt (67). Next to pulley (66) is fiber clutch (68). Fiber clutch plate (68) slips on clutch felt (69B), which is securely cemented to take-up clutch pulley (69). Consequently, take-up clutch pulley (69) and tire (69A) drive right-hand reel rest (12) at the varying speeds required as the tape builds up on the take-up reel.

The take-up torque in the Play position should be approximately three to four ounces, measured one inch from the center of the take-up reel. The clutch is adjusted by turning Nylock screw (65) until the correct pressure is obtained. If the correct pressure cannot be obtained, disassemble the clutch assembly and check for a worn, dirty, or oily clutch felt (69B). If so, replace clutch felt (69B) and thoroughly clean all associated parts.

Cutoff Switch Adjustment

Cutoff switch (74) can be adjusted with the recorder in any position except Stop. With the tape threaded between tape guide bracket (80) and the arm on cutoff switch bracket (75), the drive mechanism should remain on. When the tape is removed, the drive mechanism should shut itself off.

To adjust cutoff switch (74), loosen the two switch mounting screws, and position cutoff switch (74) until the correct action is obtained.

Play-Record Head Alignment

The play-record head must be lined up perfectly with the tape. If it is not, low output, loss of high frequencies, or track overlap may occur. To adjust the play-record head:

1. Head Height - When adjusting the head height on the Model XP-60S, place the play-record head in the 4T position. The top of the play-record pole piece must be even with the top edge of the tape. To adjust

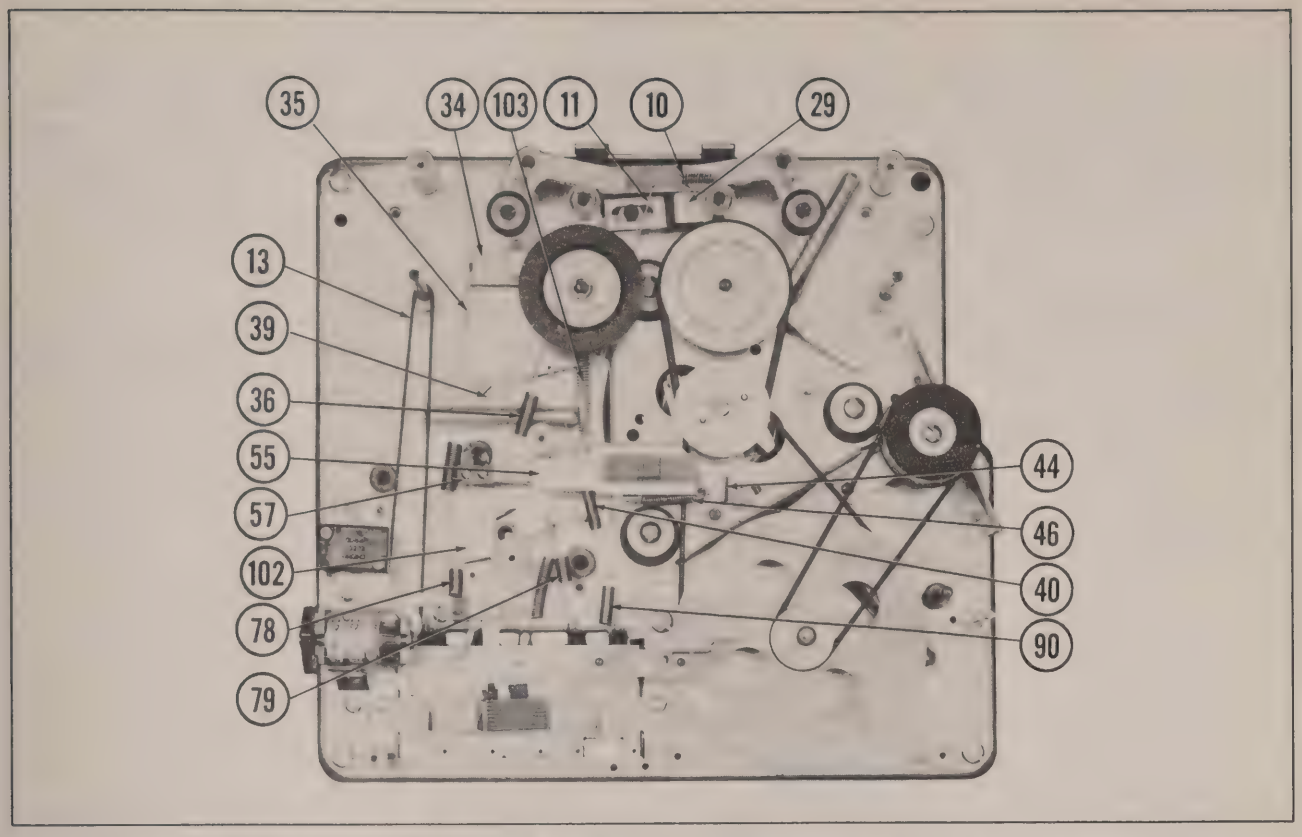


Figure 3. Top View Of Mechanism With Reel Rests And Head Mounting Bracket & Guide Ass'y. Removed.

the head height, loosen the two hex nuts on the side of the play-record head. After the proper head height has been obtained, tighten the two hex nuts.

2. Azimuth Alignment - To make this adjustment, obtain a standard alignment tape having a signal of at least 5,000 cps. Connect an AC voltmeter (0-5 volt range) to the Amp. jack. While playing back the alignment tape, pivot the play-record head by turning the three adjustment screws, until the maximum meter reading is obtained.

Erase Head Alignment

The erase head should be adjusted so that the pole piece is even with the top edge of the tape. To adjust, loosen the two hex nuts on the side of the erase head. After the proper head height is obtained, tighten the two hex nuts.

PARTS REPLACEMENT

To Replace The Flywheel And Capstan Assembly

1. Remove the two screws that mount pressure pad bracket (82). Remove pressure pad bracket (82).

2. Remove the screw from the left end of the head mounting bracket and guide assembly.

3. Remove "E" ring (60) from the right end of the head mounting bracket and guide assembly.

4. While leaving springs (63) and (64) attached, lift the head mounting bracket and guide assembly from the mounting stud.

5. Remove take-up belt (64).

6. Remove capstan drive belt (42).

7. Remove "E" ring (96) from the bottom of the capstan shaft.

8. Lift the flywheel and capstan assembly straight up and off the mechanism plate, being careful not to lose ball bearing (94).

9. To reassemble, reverse the foregoing procedure.

To Replace The Capstan Drive Belt

Capstan drive belt (42) can be removed and replaced without disassembling any of the drive mechanism except take-up belt (67), detent spring (46), and fast traverse belt (31).

1. Remove take-up belt (67) from the flywheel.

2. Disconnect detent spring (46).

3. Remove fast traverse belt (31).

4. Remove capstan drive belt (42) from the flywheel, by lifting the belt over the top of the capstan and slipping it under the head mounting bracket and guide assembly.

Work the belt from between the forked end of speed change fork (55) and speed change detent (44). Lift the belt off the motor pulley.

To replace the belt, reverse the foregoing procedure.

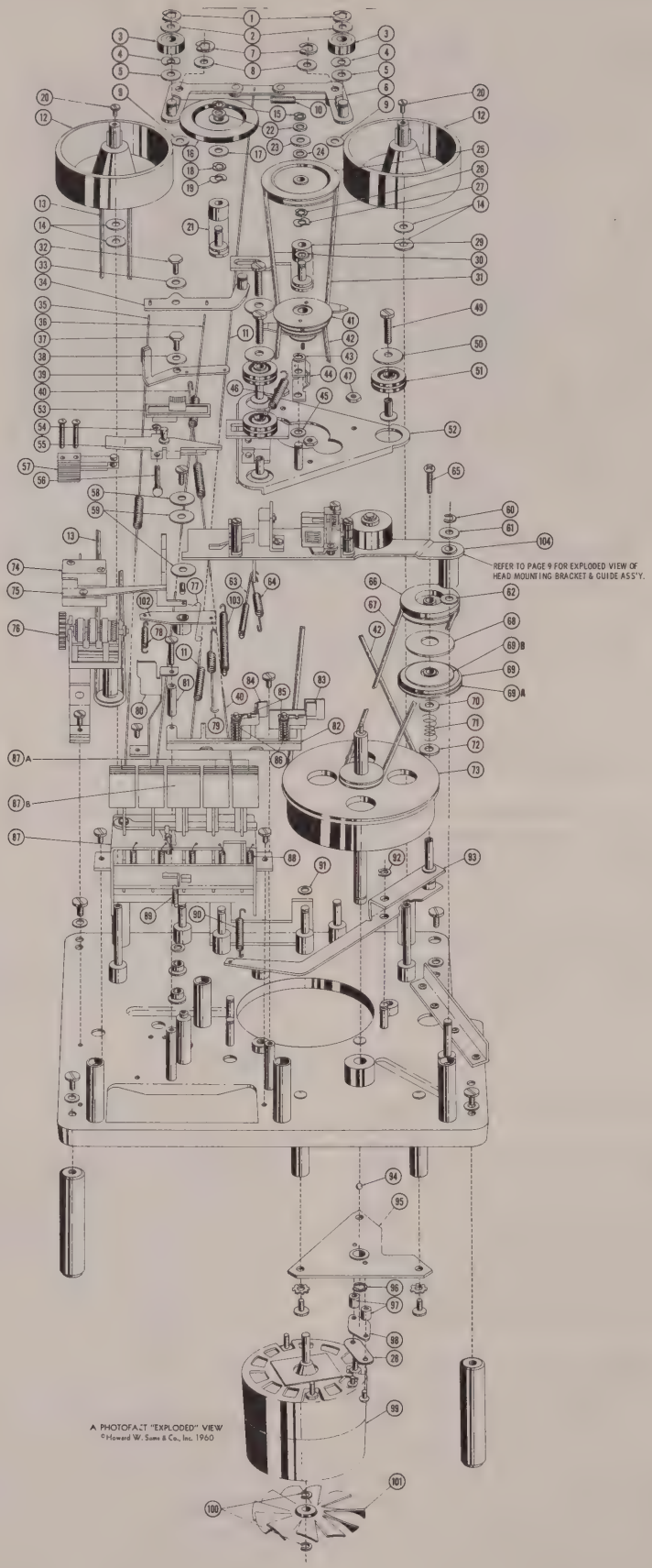


Figure 4. Exploded View Of Tape Transport Mechanism.

LUBRICATION

All moving parts in this recorder were permanently lubricated at the factory. If any parts are replaced, their bearing surfaces must be coated with a lightweight grease. Do not lubricate unless any parts are replaced.

The basic rule is - do not overlubricate. Grease must be kept off all rubber idlers and belts; the rim of the flywheel, and off any parts that might transfer grease to them. If any grease falls on these parts, wipe them with a soft cloth, and clean the belts and idlers with alcohol. Always wipe excess lubricant from lubricated parts.

CLEANING

The play-record and erase heads, capstan (73), and pressure roller (105) may accumulate tape coating oxide, which is worn off the tape as it passes these parts. These parts should be cleaned occasionally with a soft cloth and alcohol.

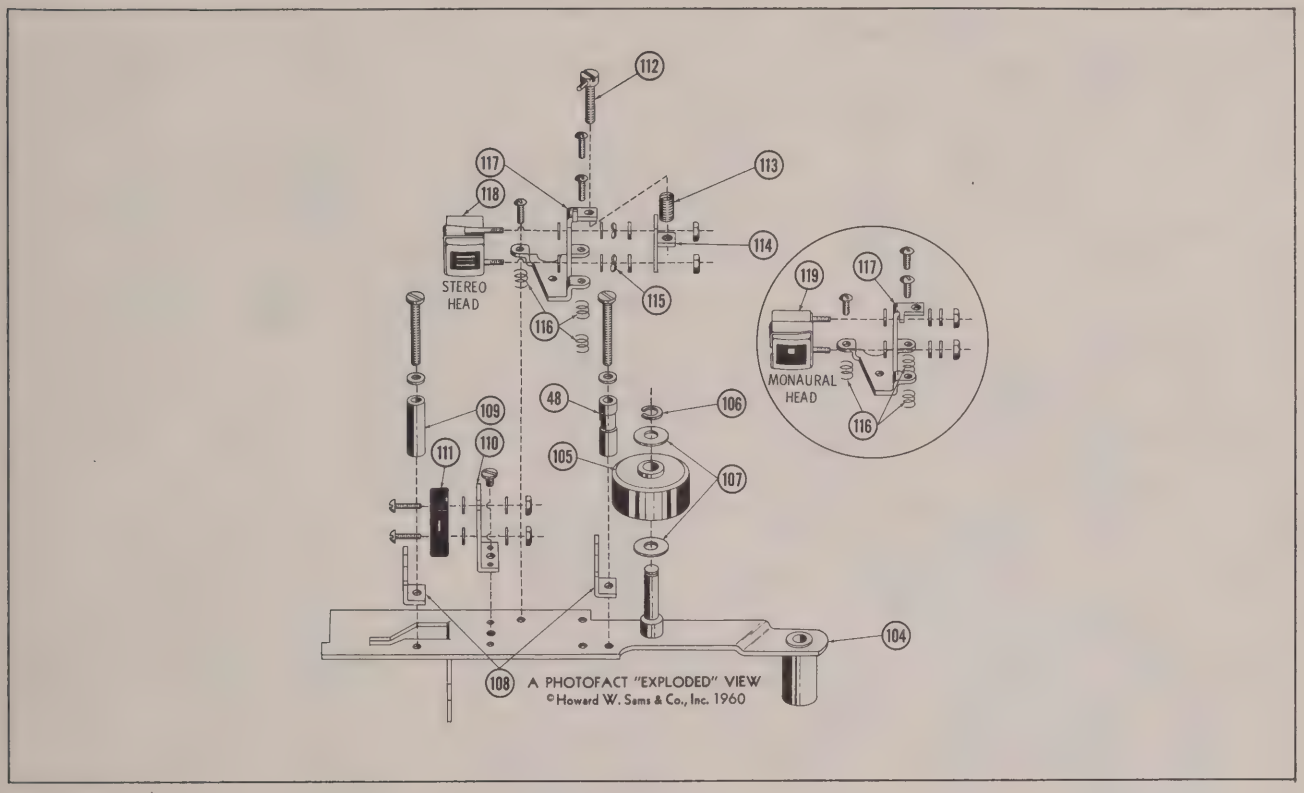


Figure 5. Exploded View Of Head Mtg. Bracket And Guide Ass'y.

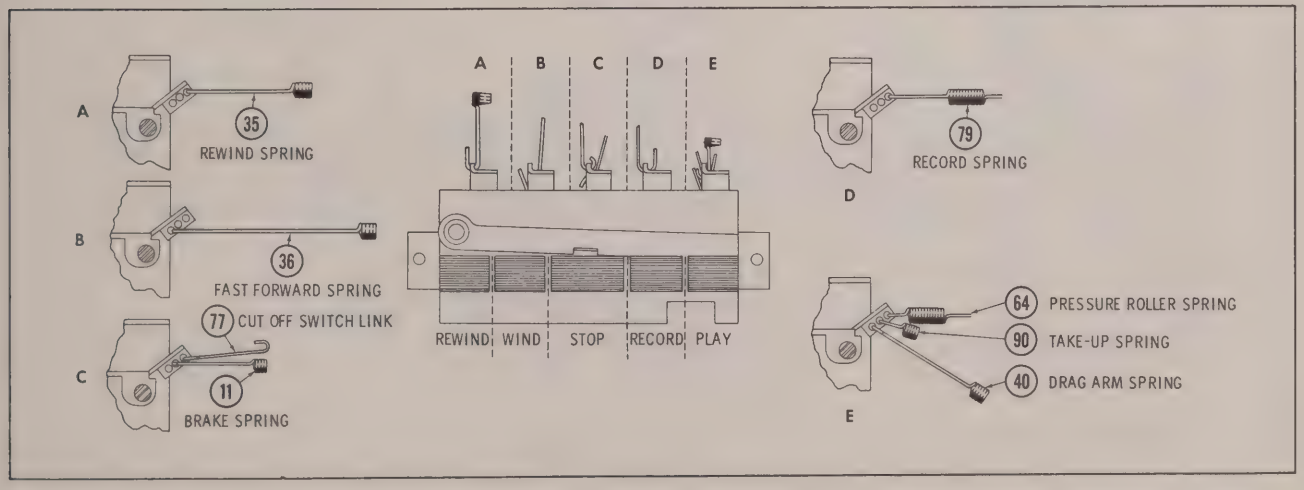
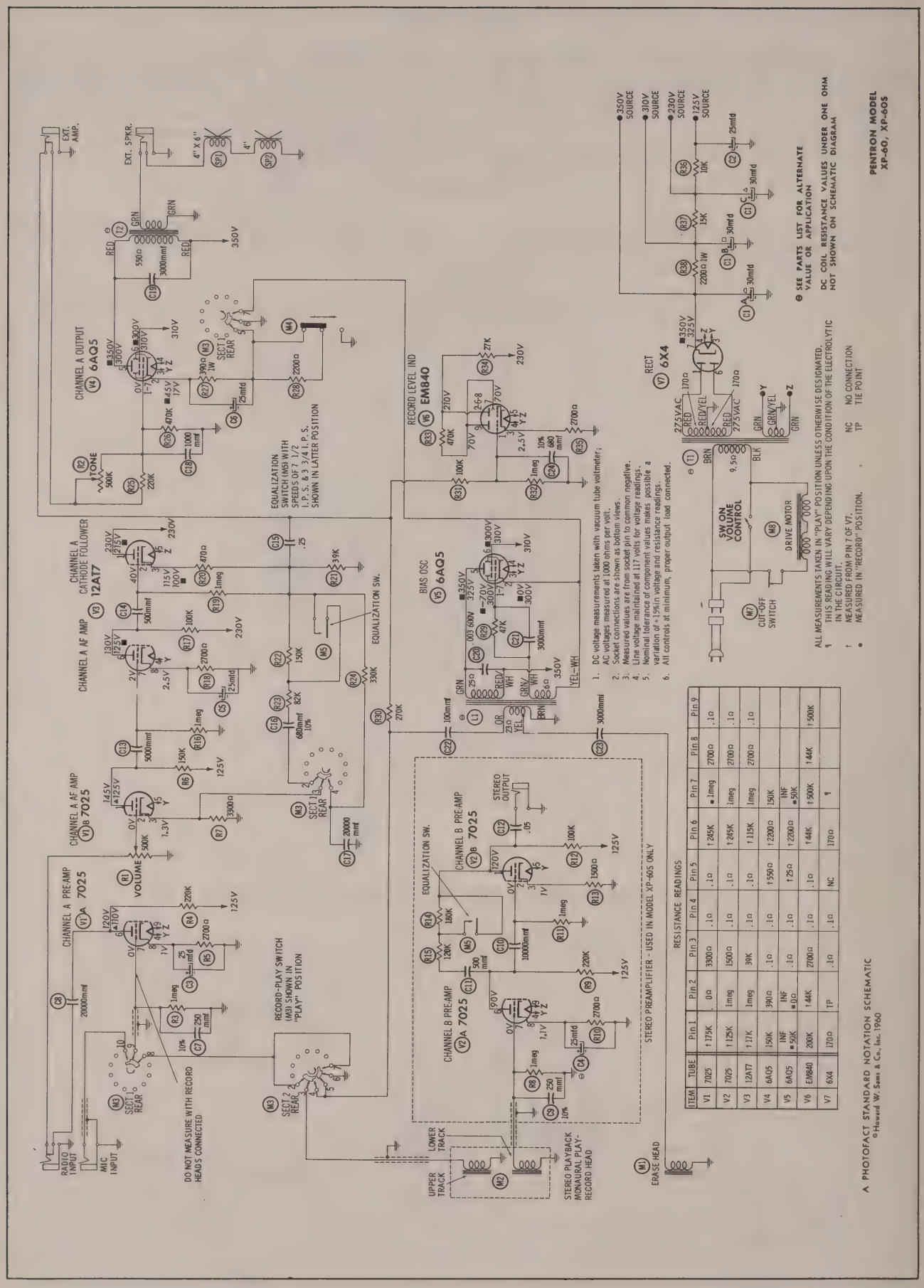


Figure 6. Push Button Spring Connections.


PENTRON MODEL
XP-60, XP-605
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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CHANNEL A PRE-AMP V1A 7025
CHANNEL A AF AMP V1B 7025
CHANNEL A CATHODE FOLLOWER V3 12AT7
CHANNEL A OUTPUT V4 6AQ5
BIAS OSC V5 6AQ5
RECORD LEVEL IND V6 EM840
RECT V7 6X4
CHANNEL B PRE-AMP V2A 7025
CHANNEL B PRE-AMP V2B 7025
STEREO PREAMPLIFIER - USED IN MODEL XP-605 ONLY
RESISTANCE READINGS
ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9
V1 | 7025 | ↑175K | 0Ω | 3300Ω | .1Ω | .1Ω | ↑245K | ●1meg | 2700Ω | .1Ω
V2 | 7025 | ↑125K | 1meg | 1500Ω | .1Ω | .1Ω | ↑245K | 1meg | 2700Ω | .1Ω
V3 | 12AT7 | ↑17K | 1meg | 39K | .1Ω | .1Ω | ↑115K | 1meg | 2700Ω | .1Ω
V4 | 6AQ5 | 150K | 390Ω | .1Ω | .1Ω | ↑550Ω | ↑2200Ω | 150K | | |
V5 | 6AQ5 | INF ●50K | INF ●0Ω | .1Ω | .1Ω | ↑25Ω | ↑2200Ω | INF ●50K | | |
V6 | EM840 | 200K | ↑44K | 2700Ω | .1Ω | .1Ω | ↑44K | ↑500K | ↑44K | ↑500K
V7 | 6X4 | 170Ω | TP | .1Ω | NC | 170Ω | ¶ | | | |
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±5% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.
ALL MEASUREMENTS TAKEN IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
↑ MEASURED FROM PIN 7 OF V7.
● MEASURED IN "RECORD" POSITION.
NC NO CONNECTION
TP TIE POINT
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
EQUALIZATION SWITCH (M5) WITH SPEEDS OF 7 1/2 I.P.S. & 3 3/4 I.P.S. SHOWN IN LATTER POSITION
RECORD-PLAY SWITCH (M3) SHOWN IN "PLAY" POSITION
DO NOT MEASURE WITH RECORD HEADS CONNECTED
SW ON VOLUME CONTROL
CUT-OFF SWITCH
DRIVE MOTOR
ERASE HEAD
STEREO PLAYBACK MONAURAL PLAY-RECORD HEAD
UPPER TRACK
LOWER TRACK
RADIO INPUT
MIC INPUT
EXT. AMP.
EXT. SPKR.
4" X 6"
4"
350V SOURCE
310V SOURCE
230V SOURCE
125V SOURCE

Figure 7. Schematic Diagram.

TROUBLES AND PROBABLE REMEDIES

Symptom	Cause	Remedy
Motor and amplifier do not operate when switch is on.	1. Damaged power cord.	1. Repair or replace power cord.
	2. Defective On-Off switch on Tone control.	2. Replace switch.
No sound; or sound is fuzzy, faint, or distorted.	1. Over or under recorded tape.	1. See "Operating Instructions".
	2. Amplifier trouble.	2. Check voltages and resistances as per schematic.
	3. Dirty play-record head.	3. Clean head with alcohol and a soft cloth.
Incomplete erase.	1. Dirty erase head.	1. Clean head with alcohol and a soft cloth.
	2. Defective erase coil.	2. Check continuity. Replace erase coil, if necessary.
Does not record.	1. Faulty microphone or cord.	1. Replace microphone or cord.
	2. Faulty input jack.	2. Repair or replace input jack.
	3. Faulty tube (S).	3. Check tubes and replace defective ones.
	4. Dirty play-record head.	4. Clean head with alcohol and soft cloth.
	5. Record spring (79) broken or disconnected.	5. Reconnect or replace record spring (79).
	6. Open play-record coil.	6. Check continuity. Replace play-record coil, if necessary.
No playback; amplifier noise only.	1. Open play-record coil.	1. Check continuity. Replace play-record coil, if necessary.
	2. Faulty play-record switch M3.	2. Check play-record switch M3. Replace, if necessary.
	3. Faulty tube V1.	3. Check tube V1. Replace, if necessary.
Poor high-frequency response.	1. Dirty play-record head.	1. Clean head with alcohol and a soft cloth.
	2. Worn pressure pads.	2. Replace pressure pads.
	3. Play-record head not aligned properly.	3. See "Play-Record Head Alignment".
No rewind.	1. Rewind spring (35) broken or disconnected.	1. Replace or reconnect rewind spring (35).
	2. Fast traverse belt (31) broken.	2. Replace fast traverse belt (31).
No wind (fast forward).	1. Fast forward spring (36) broken or disconnected.	1. Replace or reconnect fast forward spring (36).
	2. Fast traverse belt (31) broken.	2. Replace fast traverse belt (31).
Brakes do not operate when unit is placed in Stop position.	1. Brake spring (11) broken or disconnected.	1. Replace or reconnect brake spring (11).

TROUBLE CHART (Continued)

Symptom	Cause	Remedy
Speed selector not functioning properly.	1. Detent spring (46) broken or disconnected.	1. Replace or reconnect detent spring (46).
Does not record when Record button is depressed.	1. Record spring (79) broken or disconnected.	1. Replace or reconnect record spring (79).
No tape take-up when Play button is depressed.	1. Take-up spring (90) broken or disconnected.	1. Replace or reconnect take-up spring (90).
	2. Take-up belt (67) broken.	2. Replace take-up belt (67).
	3. Take-up clutch improperly adjusted.	3. See "Take-up Adjustment".
No tape drive when Play button is depressed.	1. Capstan drive belt (42) broken.	1. Replace capstan drive belt (42).
	2. Pressure roller spring (64) broken or disconnected.	2. Replace or reconnect pressure roller spring (64).
Motor doesn't turn.	1. Capstan drive belt (42) jammed on motor pulley ass'y. (41).	1. Remove top plate (see "To Remove Top Plate" Page 10) and properly reposition capstan drive belt.

CAUTION: Jamming of the capstan drive belt (42) can only be caused by changing speeds before turning on the motor.

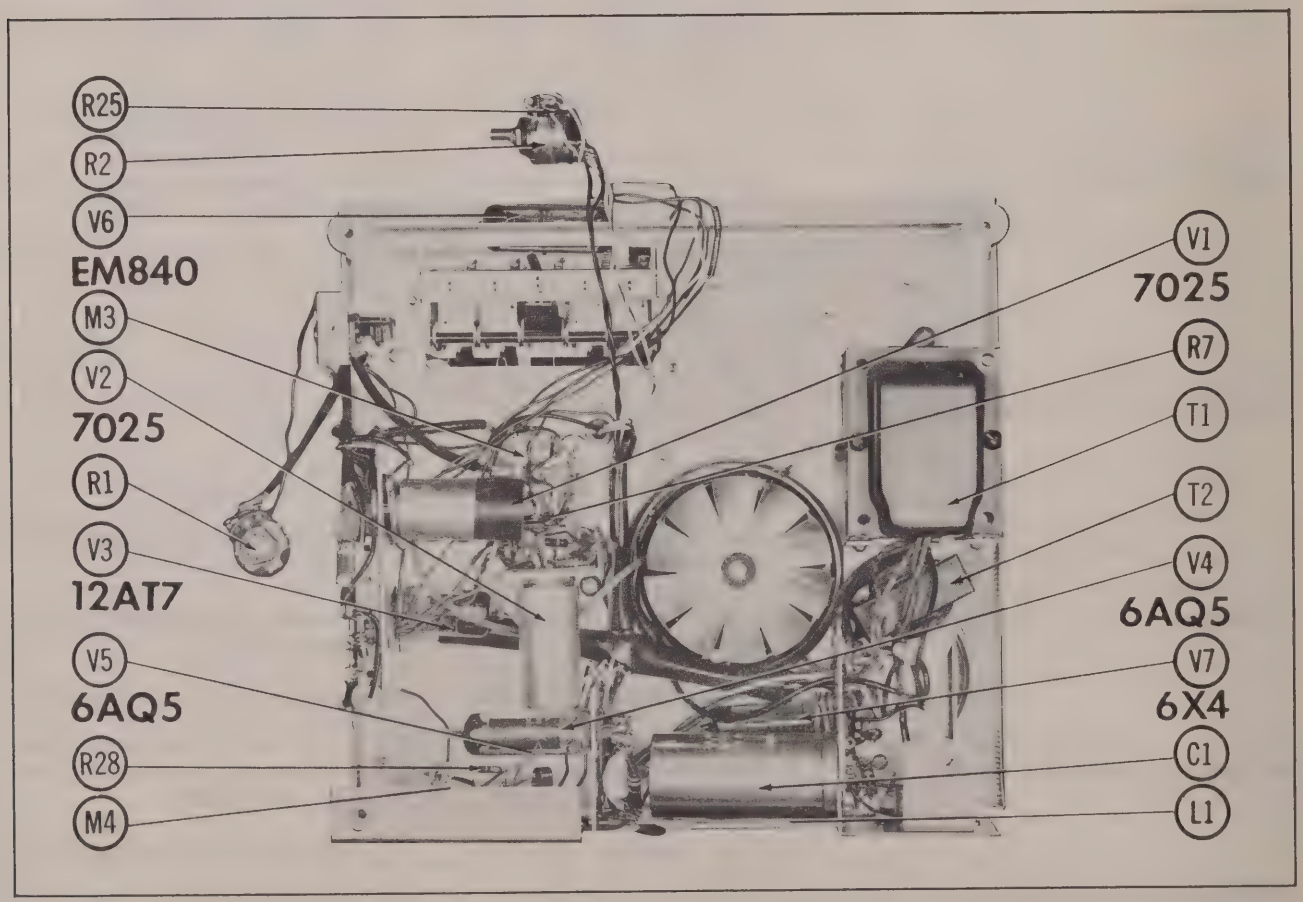


Figure 8. Composite Assembly Of Chassis.

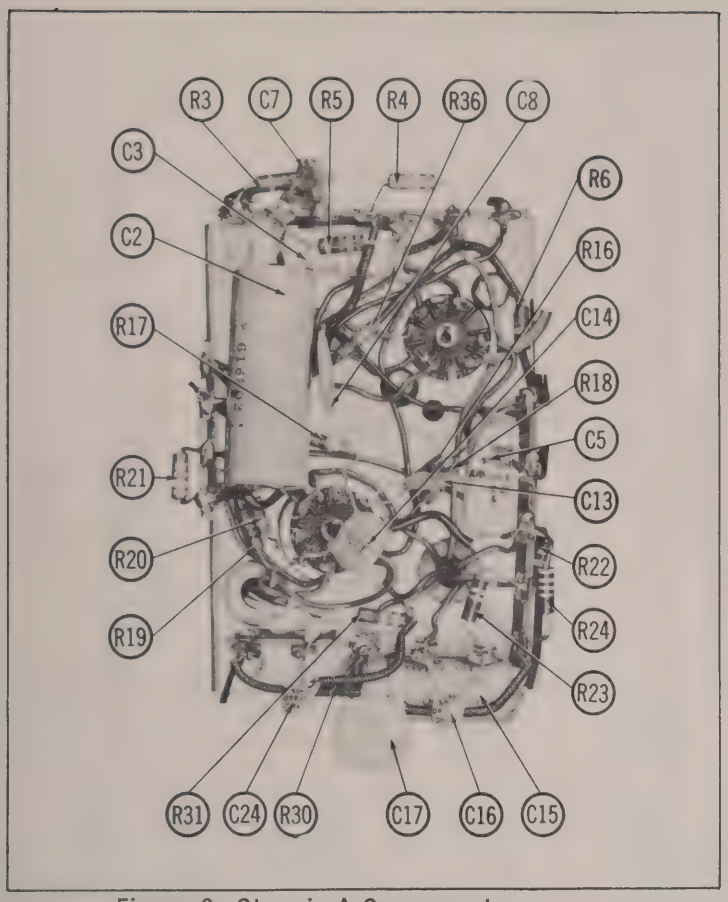


Figure 9. Chassis A Components.

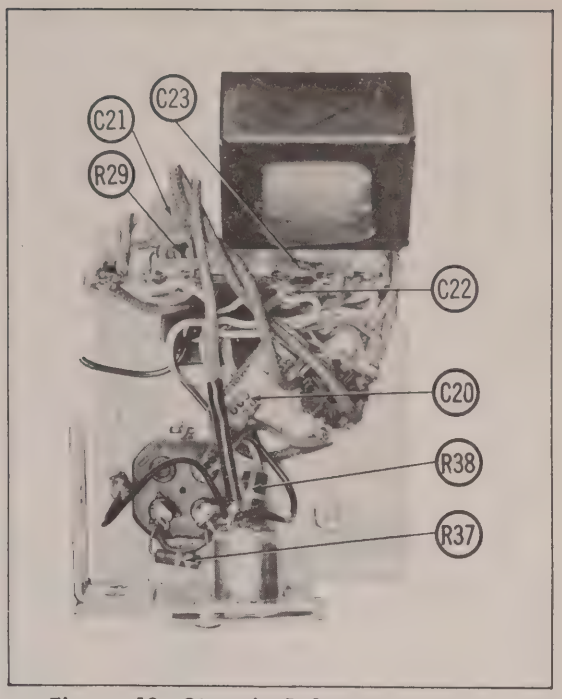


Figure 10. Chassis B Components.

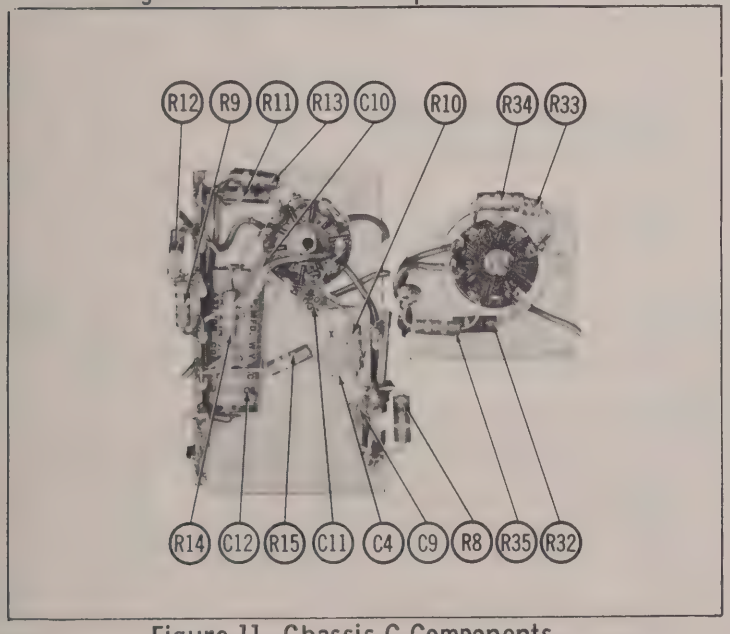


Figure 11. Chassis C Components.

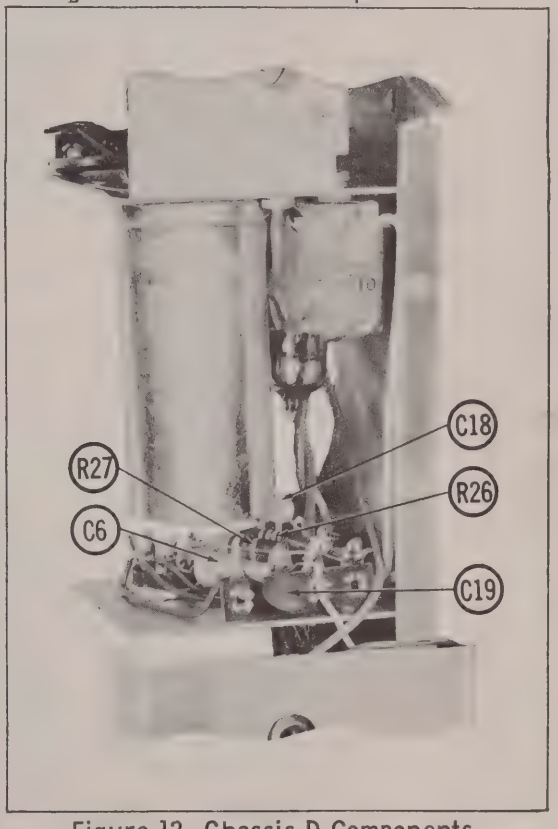


Figure 12. Chassis D Components.

Part No.	Case Parts List Description
964D57	Case Assembly
964C80	Front Trim Assembly
964C81	Cover Storage Rack Assembly
766B1	Handle
926A109	Handle Springs (2 req'd.)
926A605	Handle Stud (2 req'd.)
926A606	Handle Bushing (2 req'd.)

Part No.	Case Parts List Description
926A303	Escutcheon (Front Grille)
611-11233	Screw, # 10-32 x 3/4 Phillips Ohms (Mech. Mtg.)
619-1193	Washer, #10 Cup
824B22	Case Escutcheon, Large
824B23	Case Escutcheon, Small(2 req'd.)

AMP PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	Channel A Preamp. - Channel A AF Amp.	7025
V2	Channel B Preamp.	7025 (12AX7) *
V3	Channel A AF Amp. - Cathode Follower	12AT7
V4	Channel A Output	6AQ5
V5	Bias Oscillator	6AQ5
V6	Record Level Indicator	EM840
V7	Rectifier	6X4

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PENTRON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲30	400	285-90654	AFH3-39	C0300	FP376.7	TMT-39	TVL-3786	
B	■30	400							
C	▲30	400							
C2	25	200	273-25624	PRS1575	BR30-25	TC77	TD-30-250	TVA-1510	
C3	25	25	273-25694	PWE25025	NLW25-25	TT25X25	ML30-25	TE-1207	
C4	25	10	275-25694 ①	PWE10025	EC25-10	TT10X25	ML30-15	TE-1118	
C5	25	25	273-25694	PWE25025	NLW25-25	TT25X25	ML30-25	TE-1207	
C6	25	25	273-25694	PWE25025	NLW25-25	TT25X25	ML30-25	TE-1207	

① Some versions may use 25mfd @ 25V in this application (Part #273-25694).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C7	250 10%		DI-250	DD-251	L10T25	CCD-251	GP325	10TS-T25
C8	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C9	250 10%		DI-250	DD-251	L10T25	CCD-251	GP325	10TS-T25
C10	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C11	500		BPD-0005	DD-501	BYA10T5	CCD-501	GP350	10TS-T50
C12	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C13	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C14	500		BPD-0005	DD-501	BYA10T5	CCD-501	GP350	10TS-T50
C15	.25 200V		P288N-25		CUB2P25	2DP-4-425	GEM-2025	2TM-P25
C16	680 10%		DI-680	DD-681	1R5T68	CCD-681	GP368	10TS-T68
C17	20000		BPD-02	DD-203	BYB6S2	CCD-203	GP120	5HK-S20
C18	1000		BPD-001	DD-102	BYA10D1	CCD-102	GP210	5HK-D10
C19	3000		DI-3000	DD-302	BYA10D3	CCD-302	GP230	10TS-D30
C20	.003 600V		P688N-003	D6-302	BYA10D3	6DP-1-302	GEM-623	6TM-D3
C21	3000		DI-3000	DD-302	BYA10D3	CCD-302	GP230	10TS-D30
C22	100		BPD-0001	DD-101	BYA10T1	CCD-101	GP310	10TS-T10
C23	3000		DI-3000	DD-302	BYA10D3	CCD-302	GP230	10TS-D30
C24	680 10%		DI-680	DD-681	1R5T68	CCD-681	GP368	10TS-T68

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PENTRON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	124-50413-7	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2A	500K	½	126-50413-4	B-60-S	A47-500K-Z	Q13-133	U48	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	SWE-12	US-26	Power On-Off

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	1meg	
R4	220K	
R5	2700Ω	
R6	150K	
R7	3300Ω	
R8	1meg	
R9	220K	
R10	2700Ω	
R11	1meg	
R12	100K	
R13	1500Ω	
R14	180K	
R15	120K	
R16	1meg	
R17	100K	
R18	2700Ω	
R19	1meg	
R20	470Ω	

RESISTORS (cont)

ITEM No.	RATING	REMARKS
R21	39K	
R22	150K	
R23	82K	
R24	330K	
R25	220K	
R26	470K	
R27	390Ω 1W	
R28	2200Ω	
R29	47K	
R30	270K	
R31	100K	
R32	1meg	
R33	470K	
R34	27K	
R35	2700Ω	
R36	10K	
R37	15K	
R38	2200Ω 1W	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA PENTRON PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Bias Oscillator	311A13 ①						

① Alternate Part #311A21.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA PENTRON PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .4A	550VCT @ .045A	6.3VCT @ 2.6A	352A33-2 ①						

① Part #352A36 used in some models.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA PENTRON PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	11.5K	6-8Ω	342A12 ①			AU-600	A-3823			① Part #342A22 used in some models

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA PENTRON PART No.	QUAM PART No.	NOTES
SP1	4" x 6"	PM	3-4Ω	345B28	46A1	
SP2	4"	PM	3-4Ω	345B29	4A1	

MISCELLANEOUS

ITEM No.	PART NAME	PENTRON PART No.	NOTES
M1	Erase Head	983B2	
M2	Record Head	983B5	Model XP-60S
	Record Head	983B3	Model XP-60
M3	Switch	539A11-2	Record-Play (Rotary Wafer)
M4	Switch	532A40	Monitor (SPDT Slide Type)
M5	Switch	534A22	Equalizer (Part of Transport)
M6	Switch	964B172	Pushbutton Assembly (Rewind, Wind, Record, Play, Stop) (Part of Tape Transport)
M7	Switch	532A45	Cut Off (Part of Tape Transport)
M8	Motor	367B19	Drive
	Microphone	445-27	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knobs	814A73	Volume, Tone
Pushbutton	824A37	Rewind, Wind, Record, Play
Pushbutton	824A38	Stop
Case Assembly	964D57	
Handle	766B1	

Ref. No.	Part No.	Description
	964B185	Top Cover Casting — Model XP-60 (Not Shown On Exploded View)
	964B186	Top Cover Casting — Model XP-60S (Not Shown On Exploded View)
	761C81	Top Plate (Not Shown On Exploded View)
	611-60433	Screw, 6-32 x 1/4 Phillips OHMS (Not Shown On Exploded View)
	734A34	Tape Guide Post (Not Shown On Exploded View)
	824A41	Eye Tube Bezel (Not Shown On Exploded View)
1	619A42	"E" Ring, 1/4" Dia.
2	616A24	Washer, Clock Steel
3	964A388	Brake Roller
4	619A62	Bowed Washer
5	616A3169	Washer, Clock Steel
6	964B165	Right & Left Brake Ass'y.
7	619A28	"E" Ring, 3/16" Dia.
8	616A24	Washer, Clock Steel
9	831A5	Washer, Nylon
10	712A89	Brake Release Spring
11	712A91	Brake Spring
12	964C69	Reel Rest Ass'y.
13	854A55	Counter Belt
14	831A7	Washer, Nylon
15	619A28	"E" Ring, 3/16" Dia.
16	964A130	Idler Wheel, Rewind
17	831A5	Washer, Nylon
18	619A28	"E" Ring, 3/16" Dia.
19	619A62	Bowed Washer
20	611-40354	Screw, 4-40 x 3/16 Phillips BHMS
21	964A415	Idler Link Ass'y.
22	616A24	Washer, Clock Steel
23	871A64	Washer, Felt
24	616A24	Washer, Clock Steel
25	964A393	Traverse Pulley Ass'y.
26	619A28	"E" Ring, 3/16" Dia.
27	619A62	Bowed Washer
28	711A743	Capstan Support
29	964A414	Traverse Link Ass'y.
30	831A5	Washer, Nylon
31	854A53	Fast-Traverse Belt
32	714A562	Shoulder Screw
33	831A7	Washer, Nylon
34	964A416	Rocker Arm Ass'y.
35	712A90	Spring, Rewind
36	712A88	Spring, Fast Forward
37	714A562	Shoulder Screw
38	831A7	Washer, Nylon
39	964A427	Drag Arm Ass'y.
40	712A122	Drag Arm Spring
41	964A419	Motor Pulley Ass'y.
42	854A56	Capstan Drive Belt
43	619A28	"E" Ring, 3/16" Dia.
44	711A749	Speed Change Detent
45	831A5	Washer, Nylon
46	712A96	Detent Spring
47	614-8114	Hex Nut, #8-32 x 11/32
48	734A36	Right Tape Guide Post
49	611-11254	Screw, #10-32 x 3/4 Phillips BHMS
50	616-1244	Washer, #10 Flat
51	855A16	Shock Mount, #2
52	964B162	Motor Plate Rivet Ass'y.
53	824B21	Speed Change Button
54	619A144	"C" Ring, 1/8" Dia.
55	964A418	Speed Change Fork Ass'y.
56	714A567	Fork Pivot Pin
57	534A22	Equalizer Switch (Inc. Mtg. Screws)
58	616A38	Washer, Clock Steel
59	831A9	Washer, Nylon
60	619A28	"E" Ring, 3/16" Dia.
61	696-6160	Washer, Fibre
62	831A5	Washer, Nylon
63	712A84	Spring, Pressure Roller Release
64	712A86	Spring, Pressure Roller
65	613-60654	Screw, "Nylock", #6-32 x 3/8
66	964A390	Take-Up Pulley Ass'y.
67	854A54	Belt, Take-Up
68	811A45	Clutch Plate
69	964B182	Take-Up Clutch Ass'y.
69A	854A52	Tire, Take-Up Clutch
69B	871A67	Clutch Felt
70	831A7	Washer, Nylon
71	712A93	Spring, Take-Up Clutch
72	831A7	Washer, Nylon
73	964B157	Flywheel & Capstan Ass'y.
74	532A45	Cut Off Switch
75	964A429	Cut Off Switch Bracket Ass'y.
76	964A422	Counter & Bracket Ass'y.
77	712A123	Cut Off Switch Link
78	712A125	Spring, Switch Actuator Arm
79	712A106	Spring, Record
80	731A70	Tape Guide Bracket
81	734A32-2	Tape Guide Post
82	964A420	Pressure Pad Brkt. Ass'y.
83	964A425	Pressure Plate & Pad Ass'y. (With Shield)
84	964A426	Pressure Plate & Pad Ass'y.
85	619A144	"C" Ring, 1/8" Dia.
86	712A85	Spring, Pressure Pad
87	964B172	Push Button Ass'y.
87A	824A37	Push Button (Rewind, Wind, Record, Play)
87B	824A38	Push Button (Stop)
88	712A94	Spring, Push Button Ass'y. (6 Required)
89	712A126	Spring, Lever Locking
90	712A87	Take-Up Spring
91	831A5	Washer, Nylon
92	619A28	"E" Ring, 3/16" Dia.
93	964A436	Take-Up Bracket Ass'y.
94	713A11	Ball Bearing, 3/16" Dia.
95	964A404	Bearing Plate Ass'y.
96	619A20	"E" Ring, 5/16" Dia.
97	764A104	Spacer
98	831A6	Capstan Support Bearing, Nylon
99	964B166	Motor & Plate Ass'y.
	367B19	Motor
100	619-14-8	"C" Ring, 1/4" Dia.
101	964A440	Fan & Grommet Ass'y.
102	964A407	Switch Actuator Arm Ass'y.
103	712A22	Spring, Centering
104	964B173	Head Mtg. Brkt. & Guide Ass'y.
105	964A394	Pressure Roller
106	619-14-8	"C" Ring, 1/4" Dia.
107	811A43	Washer, Fibre
108	731A55	Tape Guide
109	734A32-1	Tape Guide Post
110	711A785	Bracket, Erase Head Mtg.
111	983B2	Erase Head
112	964A442	Adj. Screw Ass'y. (Model XP-60S)
113	712A97	Spring (Model XP-60S)
114	731A59	Adjusting Bracket(Model XP-60S)
115	619A64	Bowed Washer(Model XP-60S)
116	712A98	Compression Spring, Head Mtg.
117	731B4	Bracket, Record-Play Head Mtg.
118	983B5	Head, Monaural Play-Record, Stereo Playback (Model XP-60S)
119	983B3	Head, Monaural Play-Record (Model XP-60)

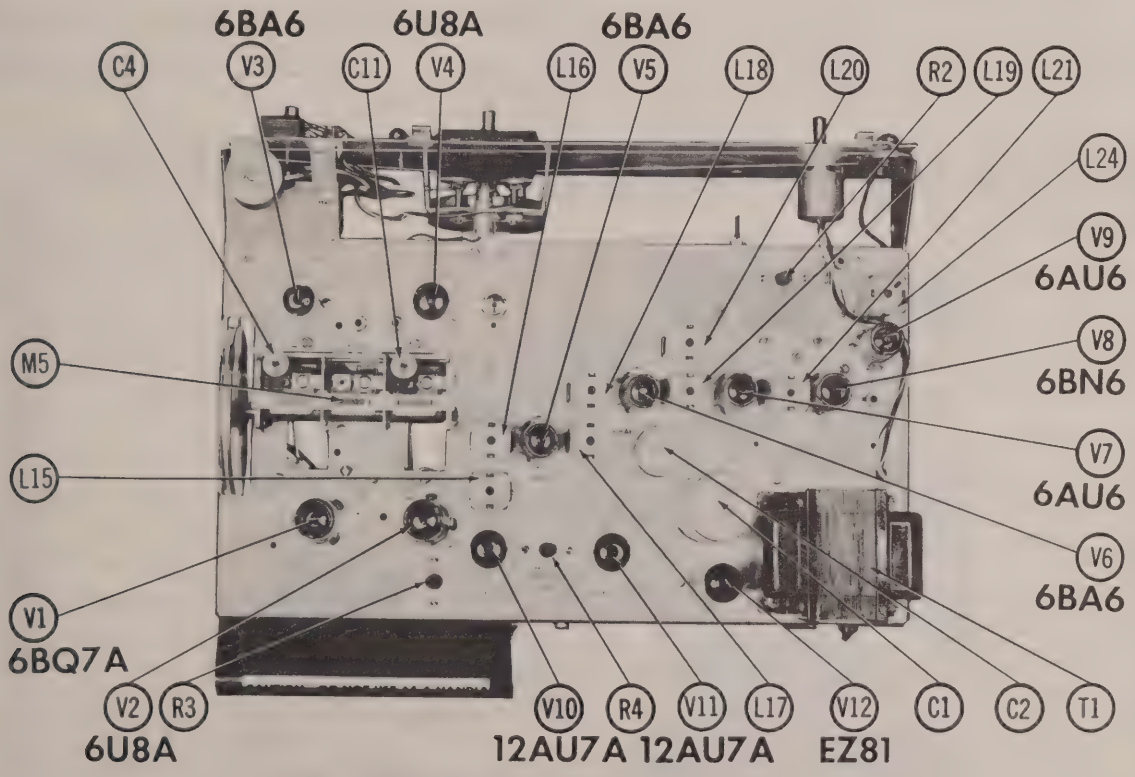
PHOTOFACT® Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PILOT
MODEL FA-670

PILOT
MODEL FA-670

TRADE NAME	Pilot Model FA-670
MANUFACTURER	Pilot Radio Corp., 37-06 36th Street, Long Island City 1, N. Y.
TYPE SET	AC Operated 12 Tube FM-AM Tuner
POWER SUPPLY	105-120 Volts AC, 60 Cycles
TUNING RANGE—BROADCAST 535 - 1700KC	RATING 64 Watts, .6 Amp. @117 Volts AC



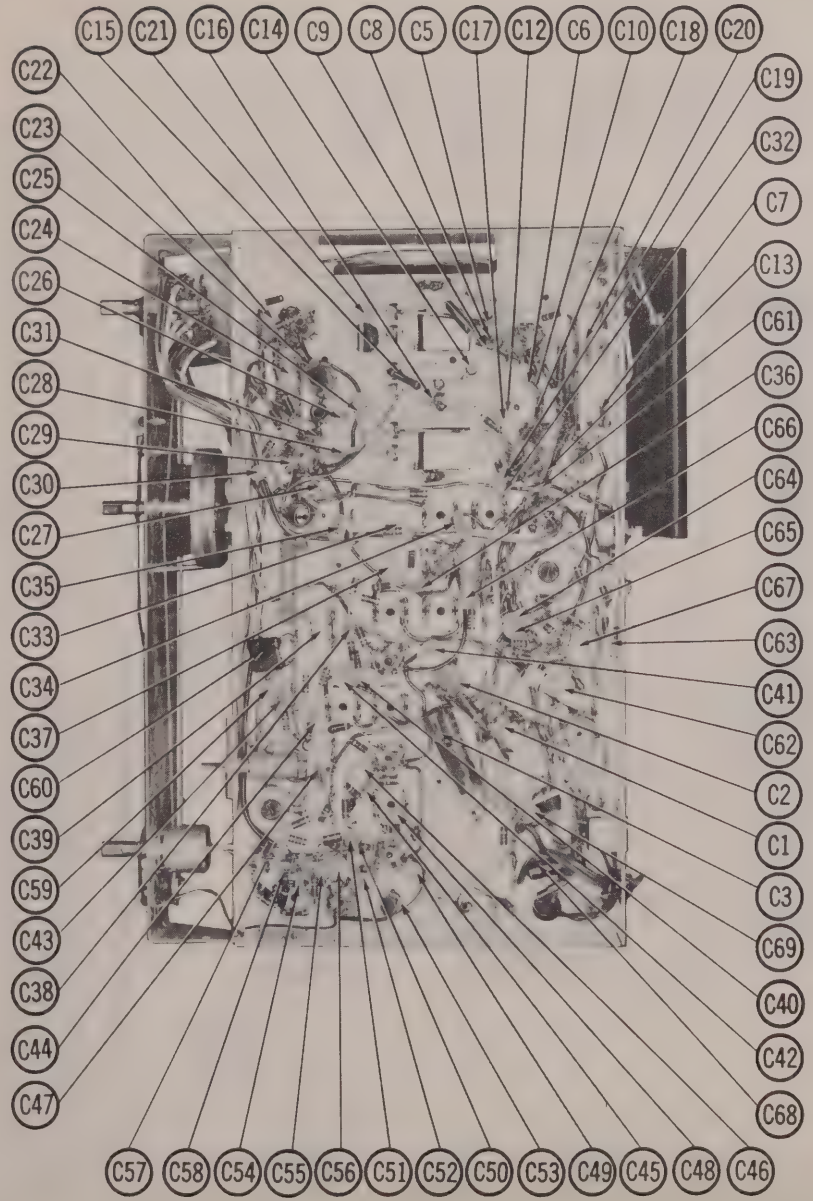
PILOT
MODEL FA-670

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

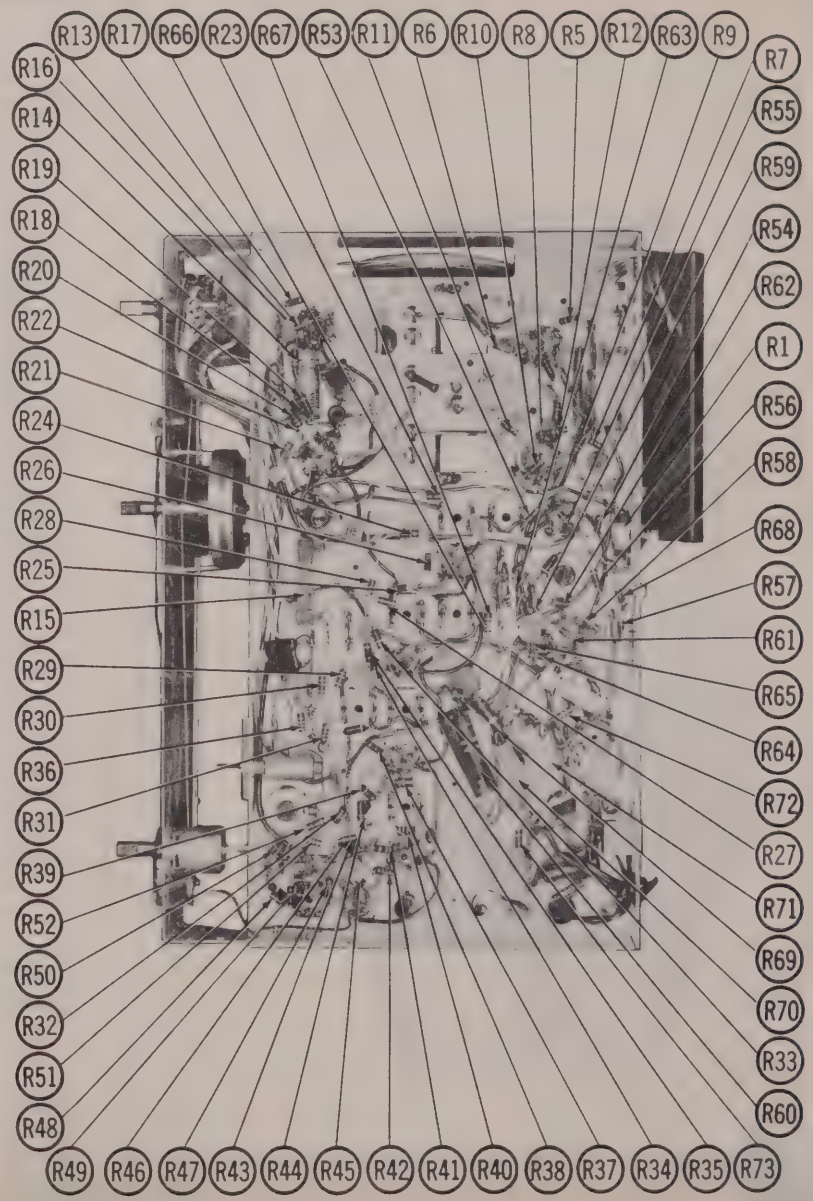
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JL598

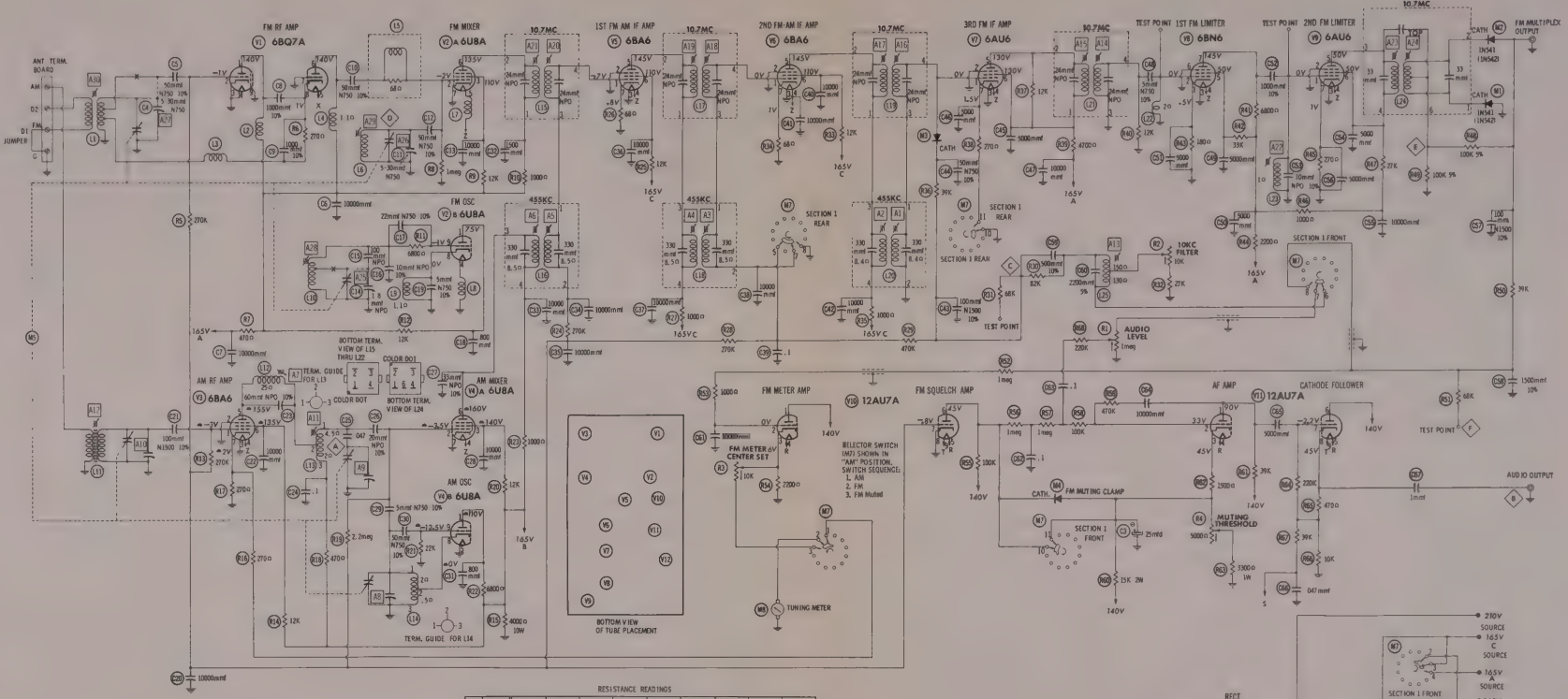
SET 477 FOLDER 10



CHASSIS BOTTOM VIEW - CAPACITOR IDENT



CHASSIS BOTTOM VIEW - RESISTOR IDENT



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BQ7A	¶910Ω	1.1meg	0Ω	0Ω	.1Ω	¶910Ω	0Ω	270Ω	0Ω
V2	6U8A	†13K	1meg	†13K	0Ω	.1Ω	†1900Ω	0Ω	1.1Ω	6800Ω
V3	6BA6	₄1.1meg	0Ω	0Ω	.1Ω	†₄930Ω	†₄12K	₄250Ω		
V4	6U8A	†₄7200Ω	₄3meg	†₄12K	.1Ω	0Ω	†₄1400Ω	₄0Ω	₄40	₄22K
V5	6BA6	1.1meg	0Ω	0Ω	.1Ω	†1400Ω	†12K	68Ω		
V6	6BA6	8.5Ω	0Ω	0Ω	.1Ω	†1400Ω	†12K	68Ω		
V7	6AU6	9Ω	0Ω	0Ω	.1Ω	¶5100Ω	¶5100Ω	270Ω		
V8	6BN6	180Ω	2Ω	0Ω	.1Ω	†35K	0Ω	†9400Ω		
V9	6AU6	1Ω	0Ω	0Ω	.1Ω	†30K	†30K	270Ω		
V10	12AU7A	†1900Ω	1.2meg	1800Ω	49K	49K	†100K	800K	0Ω	49K
V11	12AU7A	†40K	†2.1meg	8000Ω	49K	49K	†1900Ω	230K	10K	49K
V12	EZ81	60Ω	NC	¶	1Ω	0Ω	NC	58Ω	NC	NC

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT. ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
₄ MEASURED IN "AM" POSITION.
† MEASURED FROM PIN 3 OF V12.
NC NO CONNECTION.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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PILOT
MODEL FA-670

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:

A1 thru A6, A14 thru A24	GENERAL CEMENT #5097, 8727 WALSCO #2515
A8, A9, A10, A25, A26, A27	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A7, A11	GENERAL CEMENT #8606, 8606L, 8282, 9295 WALSCO #2526, 2543, 2544, 2545
A13, A28, A29	GENERAL CEMENT #8721, 8722 WALSCO #2519

AM ALIGNMENT - SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side to point (A). Low side to chassis.	455KC (400~ Mod.)	AM. Tuning gang fully closed.	AC probe to point (B). Common to chassis.	A1, A2, A3, A4, A5, A6	Adjust for maximum deflection.
2.	High side to AM antenna terminal thru 270Ω. Low side to chassis.	"	"	"	A7	Adjust for MINIMUM deflection.
3.	"	1500KC	1500KC	"	A8, A9, A10	Adjust for maximum deflection.
4.	"	600KC	600KC	"	A11, A12	Adjust for maximum deflection. Repeat Steps 3 and 4.
5.	High side to point (C). Low side to chassis.	10KC (Unmod.)	Tuning gang fully closed.	"	A13	Adjust for MINIMUM deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM - SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	High side thru .01mfd to point (D). Low side to chassis.	10.7MC (Unmod.)	FM. Point of noninterference	DC probe to pin 1 (grid) of 1st FM Limiter. Common to chassis.	A14, A15, A16, A17, A18, A19, A20, A21	Adjust for maximum deflection.
7.	"	"	"	DC probe thru 100K to point (E). Common to chassis.	A22, A23	"
8.	"	"	"	DC probe to point (F). Common to chassis.	A24	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE - SELECTOR IN FM POSITION

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6.	High side thru .01mfd to point (D). Low side to chassis.	10.7MC (450KC Swp)	FM. Point of noninterference	Vert. amp. to pin 1 (grid) of 1st FM Limiter. Low side to chassis.	A14, A15, A16, A17, A18, A19, A20, A21	Adjust for maximum gain and symmetry of response similar to Fig. 1
7.	"	"	"	Vert. amp. thru 27K to point (E). Low side to chassis.	A22, A23	"
8.	"	"	"	Vert. amp. to point (F). Low side to chassis.	A24	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A23 for maximum amplitude and straightness of crossover lines.

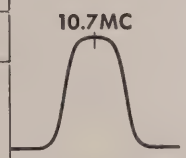


FIG. 1

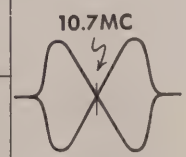
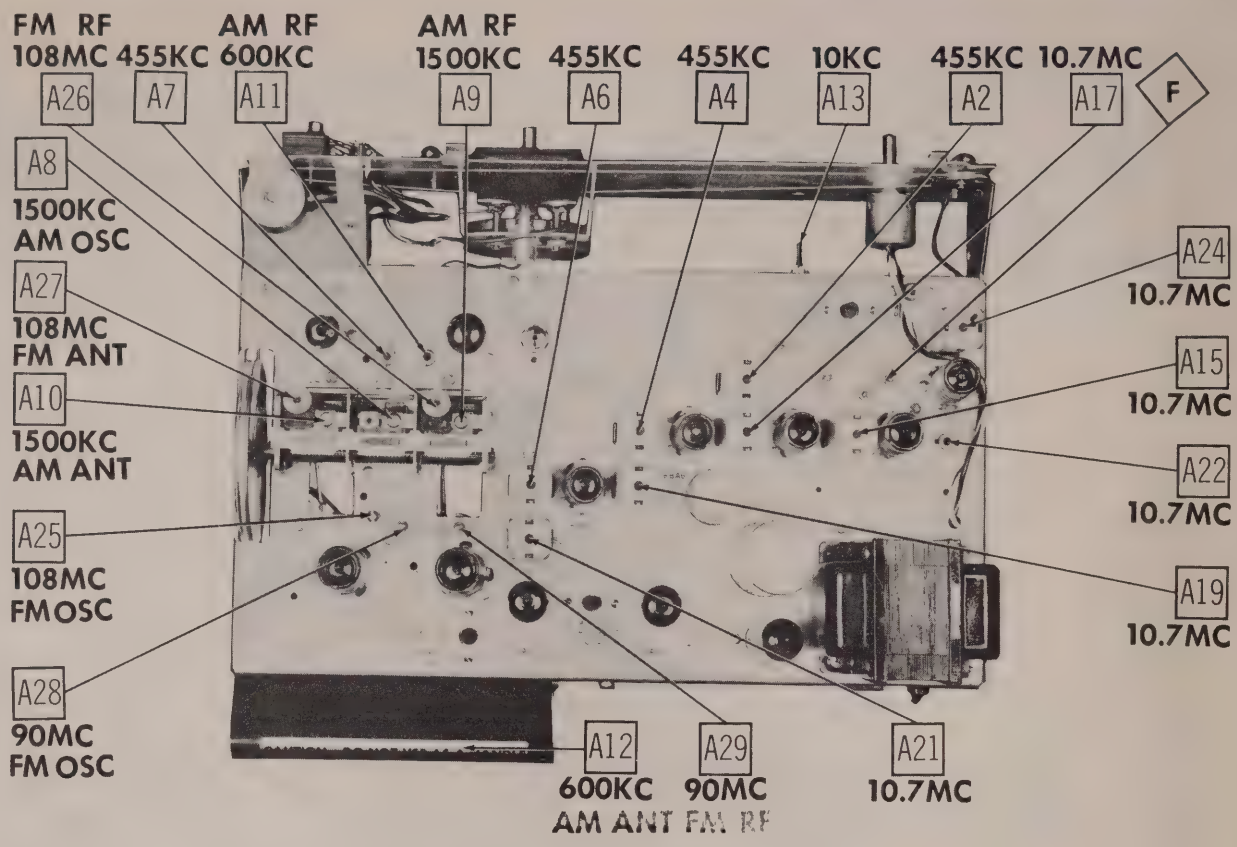


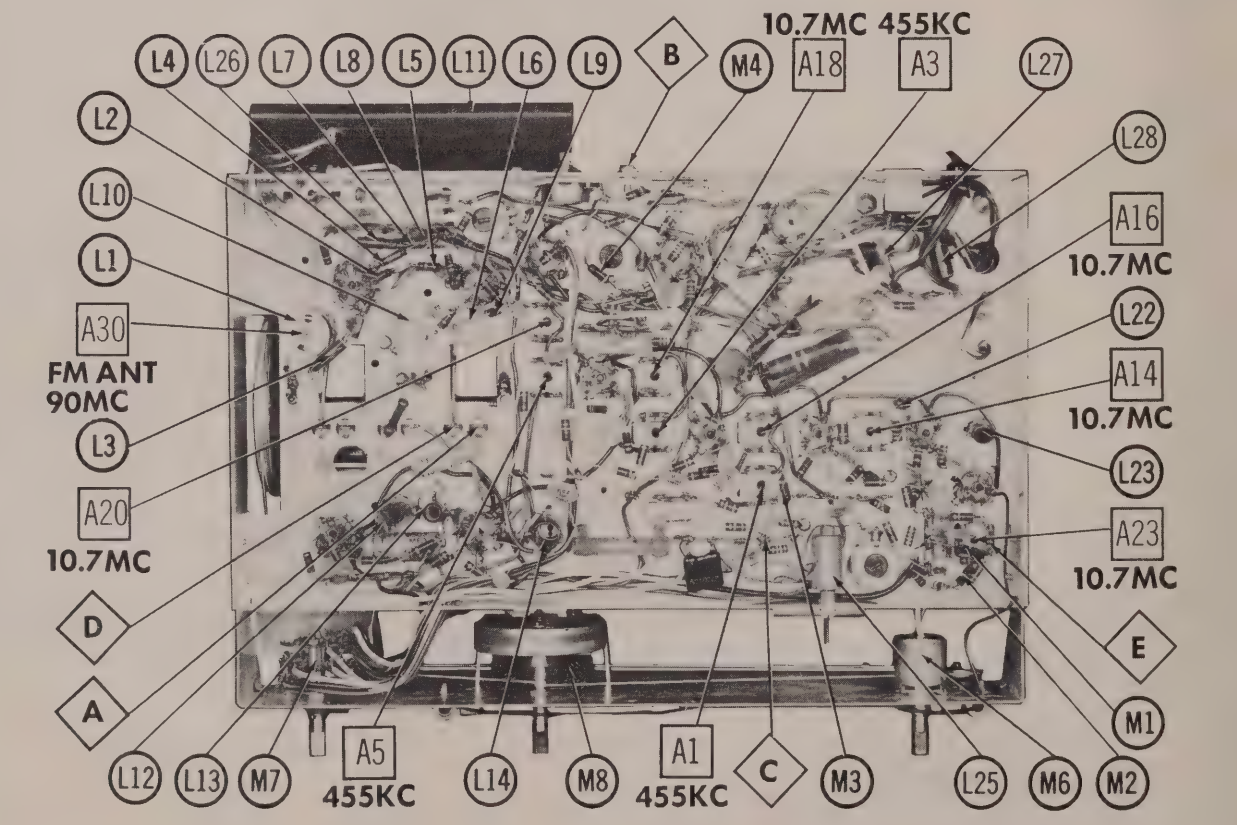
FIG. 2

FM RF ALIGNMENT - SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	High side to D2 antenna terminal thru 270Ω. Low side to chassis.	108MC (Unmod.)	FM. 108MC	DC probe to (grid) of FM Mixer. Low side to chassis.	A25, A26, A27	Adjust for maximum deflection.
10.	"	90MC	90MC	"	A28, A29, A30	"



CHASSIS - TOP VIEW



CHASSIS BOTTOM VIEW - ALIGNMENT, INDUCTOR & MISC IDENT

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	FM RF Amplifier	6BQ7A	V8	1st FM Limiter	6BN6
V2	FM Mixer-Osc.	6U8A	V9	2nd FM Limiter	6AU6
V3	AM RF Amplifier	6BA6	V10	FM Meter Amp. - FM Squelch Amp.	12AU7A
V4	AM Mixer-Osc.	6U8A	V11	AF Amp-Cathode Follower	12AU7A
V5	1st FM-AM IF Amplifier	6BA6	V12	Rectifier	EZ81 (6CA4) *
V6	2nd FM-AM IF Amplifier	6BA6			
V7	3rd FM IF Amplifier	6AU6			

CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	40	300	24-123	AFH3-25-50	C0194	FP227.5	TMD-104	TVL-3583	
B	80	250				TC58	TD-40-250		
C	40	250							
C2	40	250	①	AFH1-29	XA0291	FP146	TMS-31	TVL-1519	
C3	25	50	①	PRS1340	BBR25-50	TC36	TD-25-50	TVA-1306	

① Some versions may combine C2 and C3 in one dual unit (Part #24-175).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	5-30 N750							
C5	50 N750 10%		N750-DI 47	TCN-50	C10Q5C	CCTN-470	CN7-447	10TCU-Q47
C6	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C7	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C8	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C9	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C10	50 N750 10%		N750-DI 47	TCN-50	C10Q5U	CCTN-470	CN7-447	10TCU-Q47
C11	5-30 N750							
C12	50 N750 10%		N750-DI 47	TCN-50	C10Q5U	CCTN-470	CN7-447	10TCU-Q47
C13	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C14	1-8 NPO							
C15	100 NPO		NPO-SI 100	TCZ-100	C10T1C	CCTO-101	CNO-310	10TCC-T10
C16	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C17	22 N750 10%		N750-DI 22	DTN-22	C10Q22U	CCTN-220	CN7-422	10TCU-Q22
C18	800		BPD-0008	DD-801	L10T8	CCD-801	GP382	10TS-T80
C19	5 N750 10%			DTN-5	C10V5U	CCTN-050	CN7-550	10TCU-V50
C20	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C21	100 N1500 10%			TCL-100		*		
C22	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C23	60 NPO 10%			TCZ-62	C10Q62C	CM-15-E-620K		
C24	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C25	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C26	20 NPO 10%		NPO-DI 20	DTZ-20	C10Q2C	CCTO-200	CNO-422	10TCC-Q20
C27	33 NPO 10%		NPO-DI 33	DTZ-33	C10Q33C	CCTO-330	CNO-433	10TCC-Q33
C28	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C29	5 N750 10%			DTN-5	C10V5U	CCTN-050	CN7-550	10TCU-V50
C30	50 N750 10%		N750-DI 47	TCN-50	C10Q5U	CCTN-470	CN7-447	10TCU-Q47
C31	800		BPD-0008	DD-801	L10T8	CCD-801	GP382	10TS-T80
C32	1500		BPD-0015	DD-152	BYA10D15	CCD-152	GP215	5HK-D15
C33	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C34	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C35	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C36	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C37	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C38	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C39	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C40	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C41	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C42	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C43	100 N1500 10%			TCL-100		*		
C44	50 N750 10%		N750-DI 47	TCZ-50	C10Q5U	CCTN-470	CN7-447	10TCU-Q47
C45	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C46	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C47	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C48	5 N750 10%			DTN-5	C10Q5U	CCTN-050	CN7-550	10TCU-V50
C49	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C50	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C51	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C52	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C53	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C54	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C55	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C56	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C57	100 N1500 10%			TCL-100		*		
C58	1500 10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C59	500 10%		DI-500	DD-501	5R5T5	CCD-501	GP350	10TS-T50
C60	2200 5%		1464-0022		1R5D22	CM-20B-222J	MCJ459	MS-222
C61	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C62	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C63	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C64	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C65	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C66	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C67	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C68	.01 600V	Note 1	P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S1
C69	30 2000V		HVD-30-33	DD30-300	HVA20Q33	3CCD-330	2DY-433	30GA-Q30

Note 1. Not used in some versions.

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PILOT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	39-41	ABT-74	A47F5-1meg	Q19-137X	RU16T654	Audio Level
B	Shaft			AK-1	FKS-1/4	Not Req.	SL-3500	
C	Bushing			Not Req.	Not Req.	Not Req.	SL-38	
R2A	10K	½	39-46	AB-14	B47-10K-S	B11-116	SU-20	10KC Filter
B	Shaft			AK-1	Not Req.	TM4	Not Req.	
R3A	10K	½	39-46	AB-14	B47-10K-S	B11-116	SU-20	FM Meter Center Set
B	Shaft			AK-1	Not Req.	TM4	Not Req.	
R4A	5000Ω	½	39-42	BX-10	A47-5000-S	B11-114	SU-14	Muting Threshold
B	Shaft			Not Req.	FKS-1/4	TM4	Not Req.	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R5	270K	
R6	270Ω	
R7	470Ω	
R8	1meg	
R9	12K	
R10	1000Ω	
R11	6800Ω	
R12	12K	
R13	270K	
R14	12K	
R15	4000Ω 10W	
R16	270Ω	
R17	270Ω	
R18	470Ω	
R19	2.2meg	
R20	12K	
R21	22K	
R22	6800Ω	
R23	1000Ω	
R24	270K	
R25	12K	
R26	68Ω	
R27	1000Ω	

ITEM No.	RATING	REMARKS
R28	270K	
R29	470K	
R30	82K	
R31	68K	
R32	27K	
R33	12K	
R34	68Ω	
R35	1000Ω	
R36	39K	
R37	12K	
R38	270Ω	
R39	4700Ω	
R40	12K	
R41	6800Ω	
R42	33K	
R43	180Ω	
R44	2200Ω	
R45	270Ω	
R46	1000Ω	
R47	27K	
R48	100K 5%	
R49	100K 5%	
R50	39K	

ITEM No.	RATING	REMARKS
R51	68K	
R52	1meg	
R53	1000Ω	
R54	2200Ω	
R55	100K	
R56	1meg	
R57	1meg	
R58	100K	
R59	470K	
R60	15K 2W	
R61	39K	
R62	1500Ω	
R63	3300Ω 1W	
R64	220K	
R65	470Ω	
R66	10K	
R67	39K	
R68	220K	
R69	1500Ω 1W	
R70	220Ω 4W	
R71	220Ω 4W	
R72	82K	
R73	270Ω	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RATING SEC. 4	RATING SEC. 5	REPLACEMENT DATA PILOT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V@ .6A	420 VCT @.090A	6.3V@ 3.7A	6.3VCT @.6A			55-67A						

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA PILOT PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M1	1N541 *		1N60	1N295	1N295	Discriminator (Pigtail) } Matched
M2	1N541 *		1N60	1N295	1N295	Discriminator (Pigtail) } Pair
M3	1N541		1N60	1N295	1N295	AM Detection, AVC (Pigtail)
M4	1N541		1N60	1N295	1N295	FM Muting Clamp (Pigtail)

* Some versions may use a 1N542 in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA PILOT PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Trans.	70-83						
L2	RF Choke	75-52	19-2002	19-2002		4582		.15uh
L3	RF Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L4	RF Choke	75-33	19-1004	19-1004	SW-631	4529		5uh
L5	RF Choke							①
L6	FM RF Coil	71-45						
L7	Fil. Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L8	Fil. Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L9	Cathode Choke	75-33	19-1004	19-1004	SW-631	4529		5uh
L10	FM Osc. Coil	72-80						
L11	Loopstick	270-54						
L12	455KC Wave Trap Coil	79-102						
L13	AM RF Coil	71-43						
L14	AM Osc. Coil	72-78						
L15	1st FM IF Trans.	273-151	16-3487	16-3487	FM-254	1463		
L16	1st AM IF Trans.	273-153	16-6758	16-6758	BC-352	12-C1	RF-1	
L17	2nd FM IF Trans.	273-151	16-3487	16-3487	FM-254	1463		
L18	2nd AM IF Trans.	273-153	16-6758	16-6758	BC-353	12-C2	RF-2	
L19	3rd FM IF Trans.	273-151	16-3487	16-3487	FM-254	1463		
L20	3rd AM IF Trans.	273-129	16-6758	16-6758	BC-353	12-C2	RF-2	
L21	4th FM IF Trans.	273-151	16-3487	16-3487	FM-254	1463		
L22	RF Choke	75-51	19-3075	19-3075	TV-186	6172	VP-2	80uh
L23	5th FM IF Trans.	275-154						
L24	Discriminator	279-78	17-3494	17-3494	FM-253	1464		
L25	10KC Filter	79-106						
L26	Fil. Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L27	Line Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L28	Line Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh

① 4 Turns of wire on 68Ω resistor.

MISCELLANEOUS

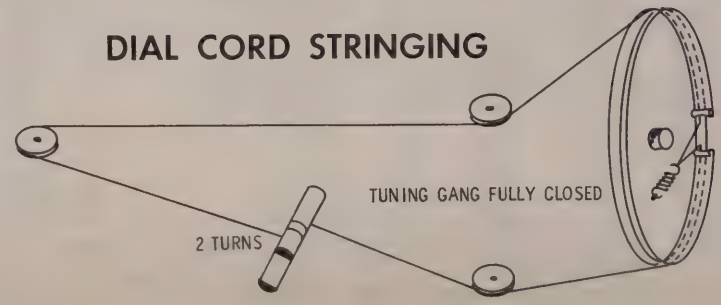
ITEM No.	PART NAME	PILOT PART No.	NOTES
M5	Tuning Cap	26-65	FM-AM, 6 Gang(Ant. 23-498mmf, RF 25-505mmf, Osc. 21-165mmf)
M6	Switch	100-139	Power Off-On
M7	Switch	100-138	Function
M8	Meter	100-576	Tuning

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

DIAL CORD STRINGING



PHOTOFACT® Folder

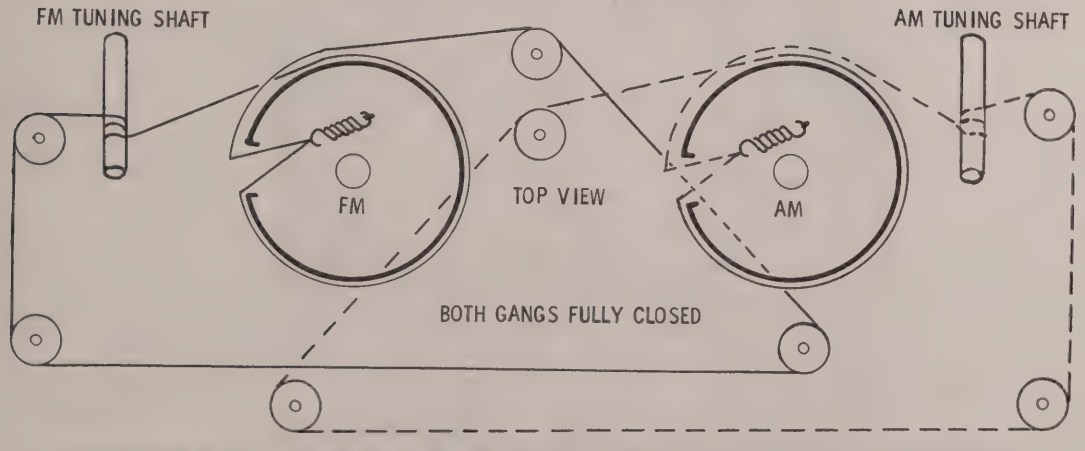
PILOT
MODEL FA-690

PILOT
MODEL FA-690

PILOT
MODEL FA-690

TRADE NAME	Pilot Model FA-690		
MANUFACTURER	Pilot Radio Corp., 37-06 36th Street, Long Island City 1, N. Y.		
TYPE SET	AC Operated 19 Tube FM-AM Tuner With Stereo Amplifier		
POWER SUPPLY	105-120 Volts AC, 60 Cycles	RATING	100 Watts, .95 Amp. @ 117 Volts AC (FM)
TUNING RANGE	BROADCAST 535 - 1720KC	FREQ. MOD.	88 - 108MC

DIAL CORD STRINGING

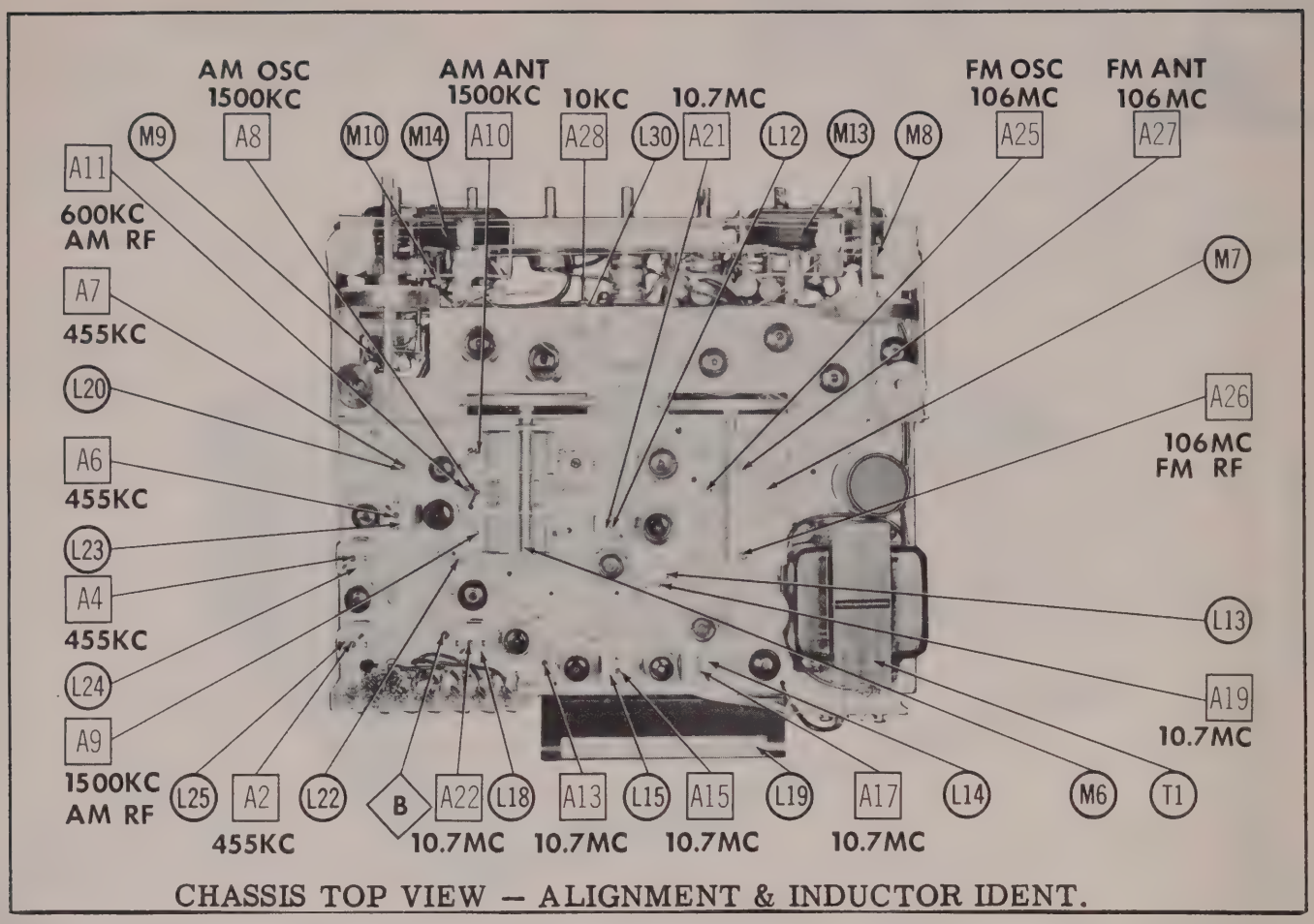


HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

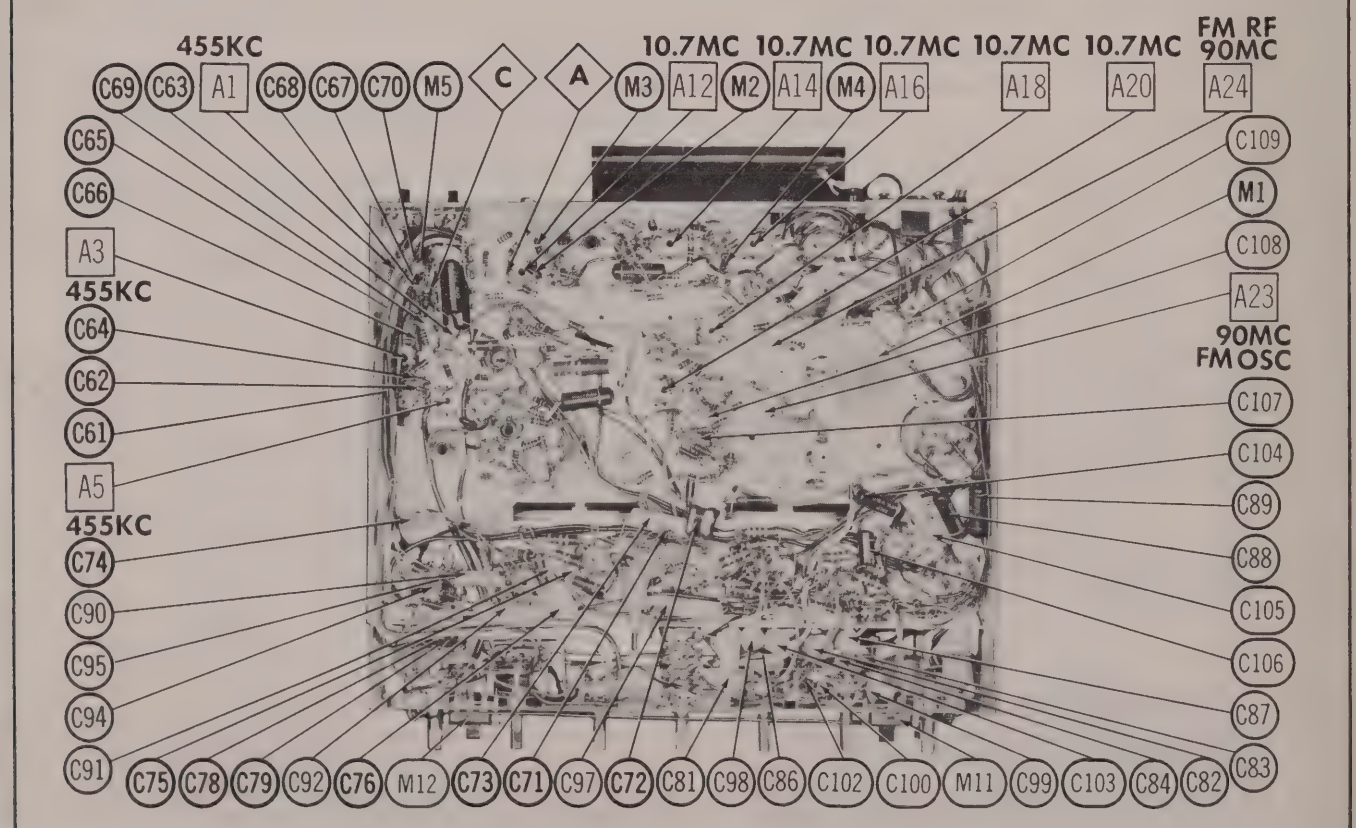
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JL478

SET 477 FOLDER 11



CHASSIS TOP VIEW – ALIGNMENT & INDUCTOR IDENT.



CHASSIS BOTTOM VIEW – ALIGNMENT, CAPACITOR (C61-C109), MISC. IDENT

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:

A1 thru A6, A12, A14 thru A22	GENERAL CEMENT #5097, 8727 WALSCO #2515
A7, A11	GENERAL CEMENT #8282, 8606, 8606L, 9295 WALSCO #2526, 2543, 2544, 2545
A8 thru A10	GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
A23, A24	GENERAL CEMENT #8271, 8273, 8275, 8276, 8721, 8722, 9150, 9298, 5003 WALSCO #2516, 2519

AM ALIGNMENT - BANDSWITCH IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .1mfd to AM RF stator lug of tuning gang. Low side to chassis.	455KC (400∿ Mod.)	AM. Tuning gang fully closed	AC probe to AM output jack. Common to chassis.	A1, A2, A3, A4, A5, A6	Adjust for maximum deflection.
2.	High side to AM antenna terminal. Low side to chassis.	"	"	"	A7	Adjust for MINIMUM deflection.
3.	"	1500KC	1500KC	"	A8, A9, A10	Adjust for maximum deflection.
4.	"	600KC	600KC	"	A11	Adjust for maximum deflection. Repeat steps 3 & 4.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM - BANDSWITCH IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .01mfd to FM RF stator lug of tuning gang. Low side to chassis.	10.7MC (Unmod.)	FM. 88MC	DC probe thru 100K to point (A). Common to chassis.	A12, A13, A14, A15, A16, A17, A18, A19, A20, A21	Adjust for maximum deflection.
6.	"	"	"	DC probe to point (B). Common to chassis.	A22	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE - BANDSWITCH IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru .01mfd to FM RF stator lug of tuning gang. Low side to chassis.	10.7MC (450KC swp)	FM. 88MC	Vert. Amp. thru 100K to point (A). Low side to chassis.	A12, A13, A14, A15, A16, A17, A18, A19, A20, A21	Adjust for maximum gain and symmetry of response similar to Fig. 1.
6.	"	"	"	Vert. Amp. to point (B). Low side to chassis.	A22	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A12 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT - BANDSWITCH IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	High side thru 270Ω to D2 antenna terminal. Low side to chassis.	90MC (Unmod.)	FM. 90MC	DC probe thru 100K to point (A). Common to chassis.	A23, A24	Adjust for maximum deflection.
8.	"	106MC	106MC	"	A25, A26, A27	Adjust for maximum deflection. Repeat steps 7 & 8.

10KC FILTER ALIGNMENT - BANDSWITCH IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	High side thru .1mfd to point (C). Low side to chassis.	10KC (Unmod.)	Any (AM)	AC probe to AM output jack. Common to chassis.	A28	Adjust for MINIMUM deflection.

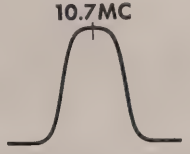
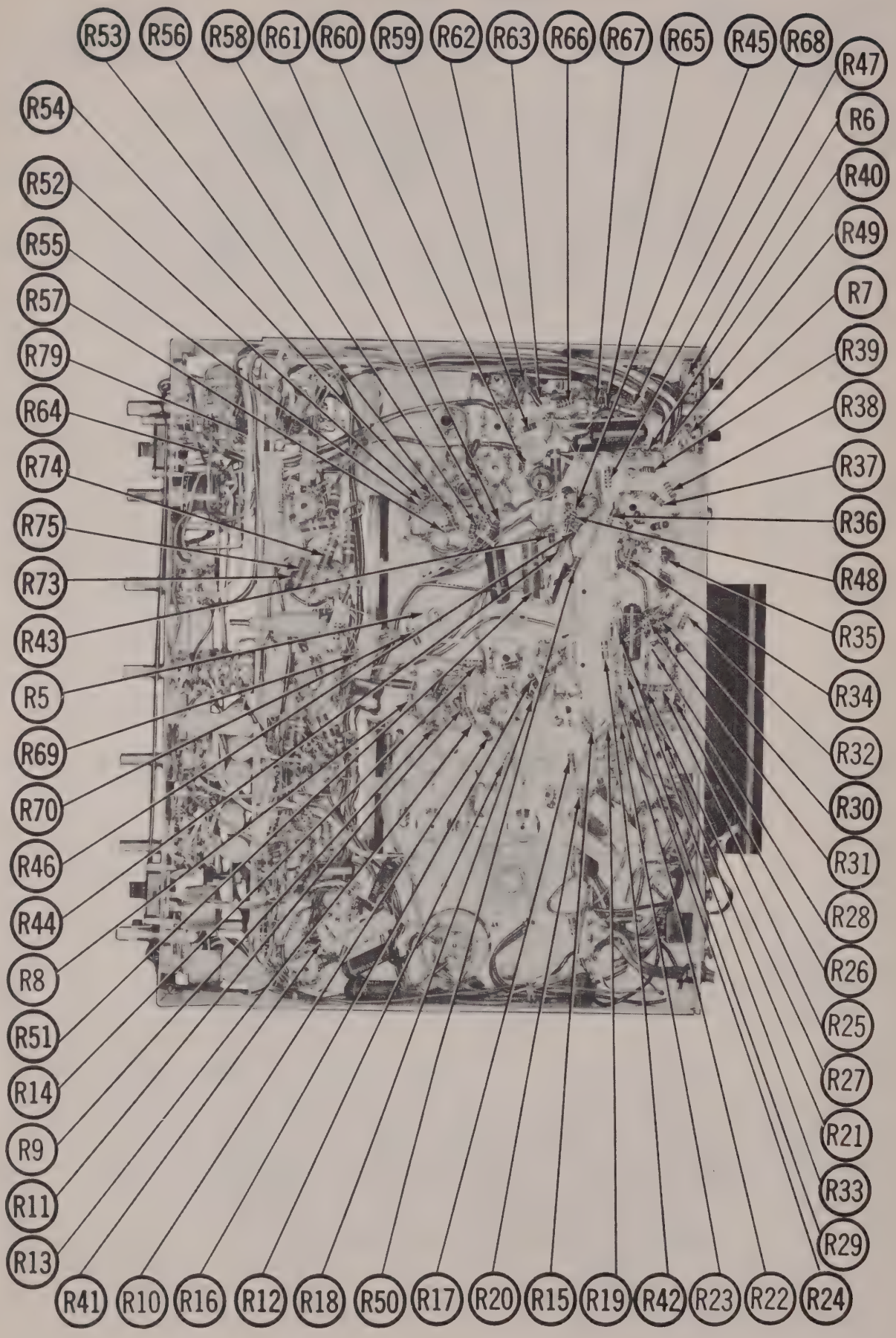
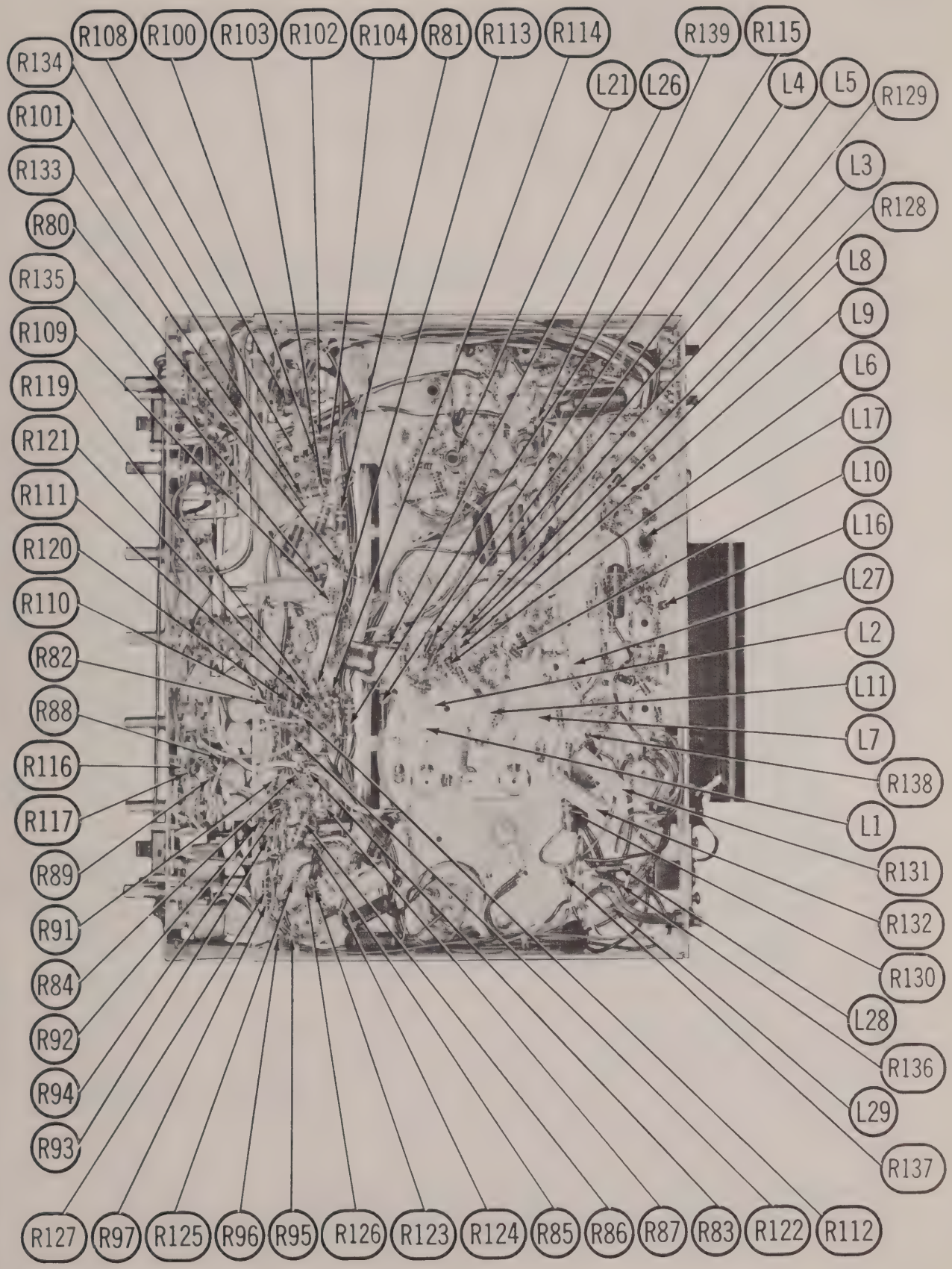


FIG. 1

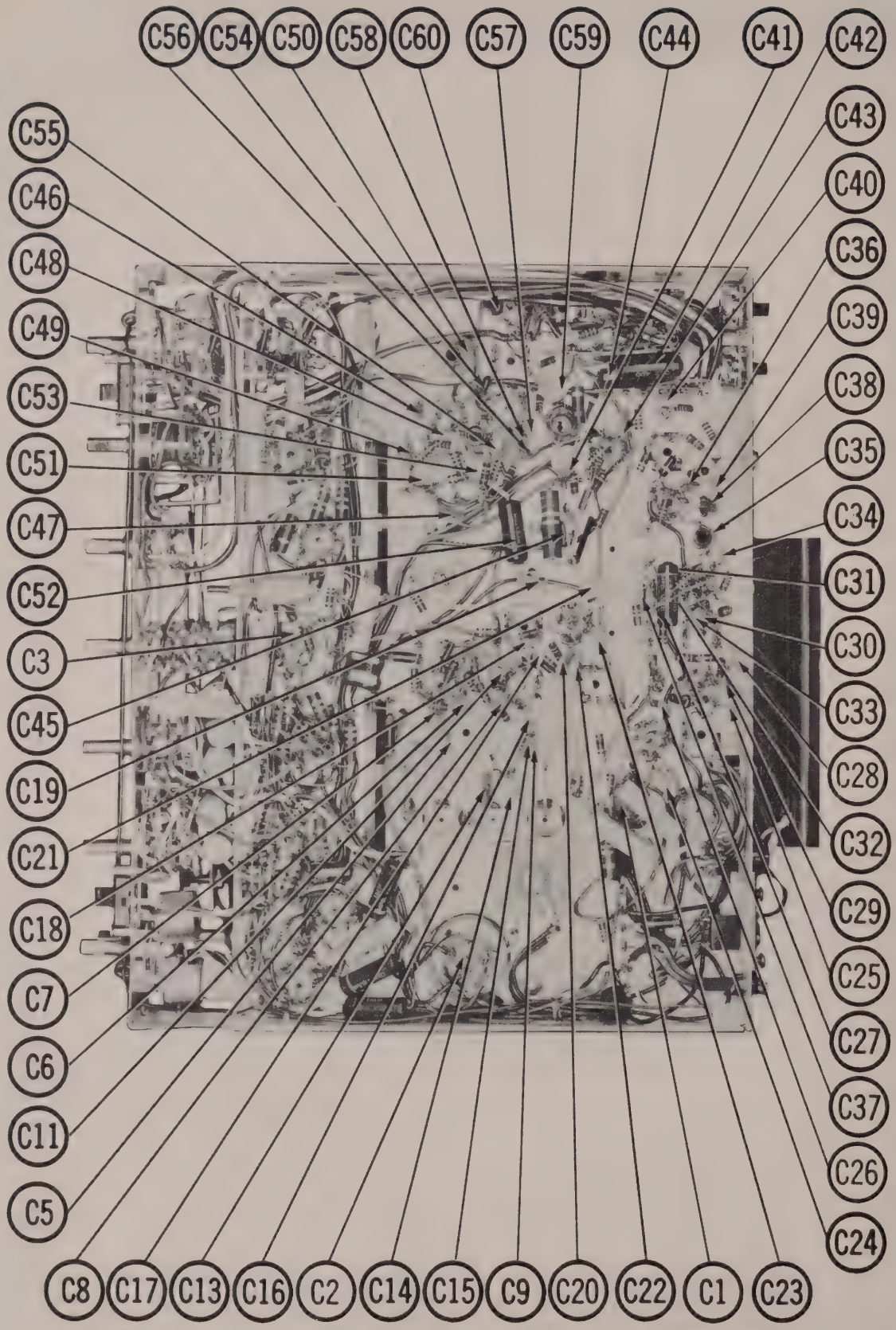
FIG. 2



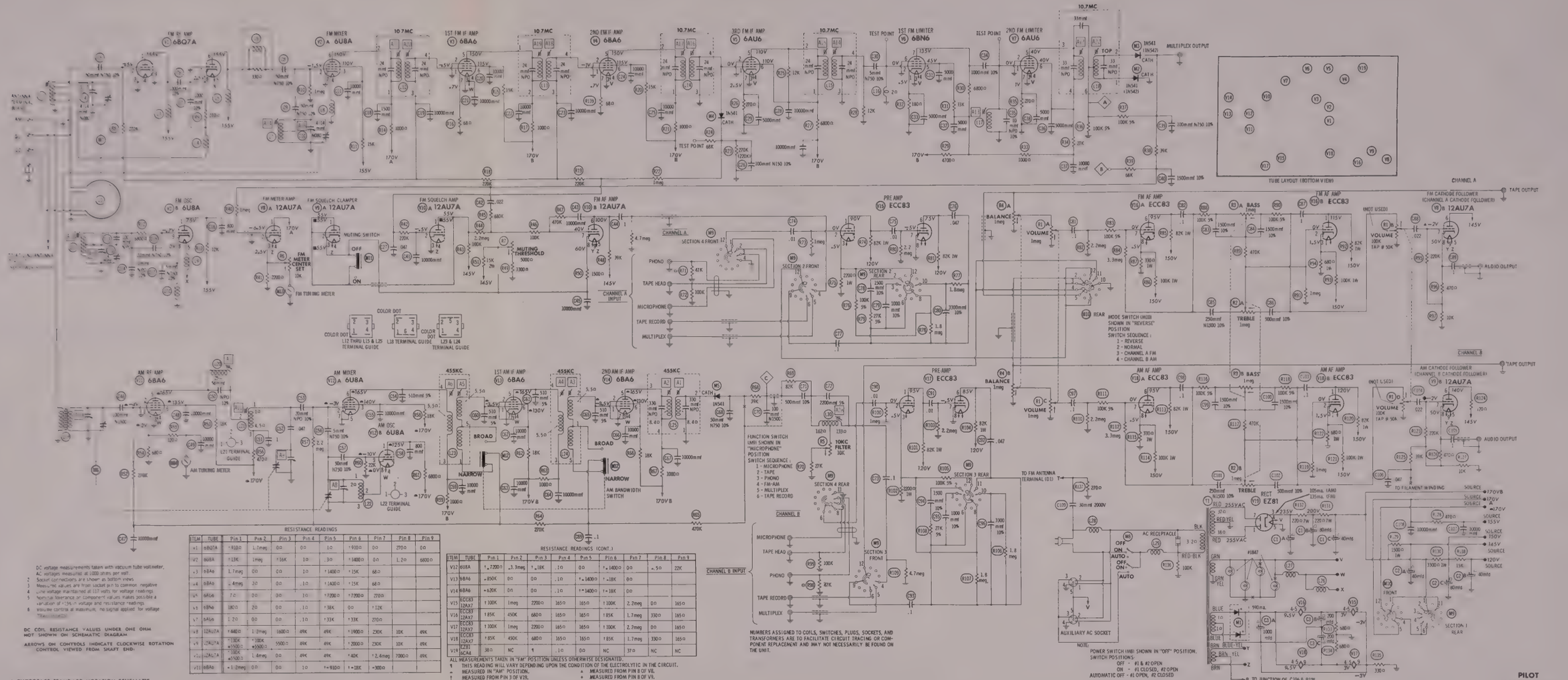
CHASSIS BOTTOM VIEW – RESISTOR (R5-R79) IDENT.



CHASSIS BOTTOM VIEW – RESISTOR (R80-R139) & INDUCTOR IDENT.



CHASSIS BOTTOM VIEW – CAPACITOR (C1-C60) IDENT.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
v1	6BQ7A	*910Ω	1.7meg	0Ω	0Ω	1Ω	*910Ω	0Ω	270Ω	0Ω
v2	6U8A	*13K	1meg	*16K	1Ω	3Ω	*1400Ω	0Ω	1.2Ω	6800Ω
v3	6BA6	1.7meg	0Ω	0Ω	1Ω	*1400Ω	*15K	68Ω		
v4	6BA6	1.4meg	3Ω	0Ω	1Ω	*1400Ω	*15K	68Ω		
v5	6AU6	1.7Ω	0Ω	0Ω	1Ω	*2700Ω	270Ω			
v6	6BN6	180Ω	2Ω	0Ω	1Ω	*38K	0Ω	*12K		
v7	6AU6	1.2Ω	0Ω	0Ω	1Ω	*33K	*33K	270Ω		
v8	12AU7A	*640Ω	1.2meg	1600Ω	49K	49K	*1900Ω	230K	10K	49K
v9	12AU7A	100K ±500Ω	*100K ±500Ω	5500Ω	49K	49K	*2000Ω	230K	10K	49K
v10	12AU7A	100K ±500Ω	1.4meg	0Ω	49K	49K	*140K	*2.4meg	7000Ω	49K
v11	6BA6	*1.2meg	0Ω	0Ω	1Ω	*910Ω	*1.8K	*300Ω		

DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2 Socket connections are shown as bottom views.
3 Measured values are from socket pin to common negative.
4 Line voltage maintained at 117 volts for voltage readings.
5 Normal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6 Volume control at maximum, no signal applied for voltage measurements.

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION CONTROL VIEWED FROM SHAFT END.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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RESISTANCE READINGS (CONT.)

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V12	6U8A	*,7200Ω	.3.3meg	*,18K	.1Ω	0Ω	*,1400Ω	0Ω	▲.5Ω	22K
V13	6BA6	▲850K	0Ω	0Ω	.1Ω	*▲1400Ω	*.18K	0Ω		
V14	6BA6	▲620K	0Ω	0Ω	.1Ω	*▲1400Ω	*▲18K	0Ω		
V15	ECC83 12AX7	†100K	1meg	2200Ω	165Ω	165Ω	†100K	2.2meg	0Ω	165Ω
V16	ECC83 12AX7	†85K	450K	680Ω	165Ω	165Ω	†85K	1.7meg	330Ω	165Ω
V17	ECC83 12AX7	†100K	1meg	2200Ω	165Ω	165Ω	†100K	2.2meg	0Ω	165Ω
V18	ECC83 12AX7	†85K	450K	680Ω	165Ω	165Ω	†85K	1.7meg	330Ω	165Ω
V19	EZ81 6CA4	38Ω	NC	¶	.1Ω	0Ω	NC	37Ω	NC	NC

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
† THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
▲ MEASURED IN "AM" POSITION.
* MEASURED FROM PIN 3 OF V25.
¶ MUTING SWITCH IN "OFF" POSITION.
▲ MEASURED FROM PIN 8 OF V8.
* MEASURED FROM PIN 8 OF V9.
NC NO CONNECTION

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE
V1	FM RF Amplifier	6BQ7A
V2	FM Mixer - Osc.	6U8A
V3	1st FM IF Amplifier	6BA6
V4	2nd FM IF Amplifier	6BA6
V5	3rd FM IF Amplifier	6AU6
V6	1st FM Limiter	6BN6
V7	2nd FM Limiter	6AU6
V8	FM Meter Amplifier - FM Cathode Follower (Channel A Cath. Foll.)	12AU7A
V9	FM Squelch Clamp - AM Cathode Follower (Channel B Cath. Foll.)	12AU7A
V10	FM Squelch Amplifier - FM AF Amplifier	12AU7A
V11	AM RF Amplifier	6BA6
V12	AM Mixer - Osc.	6U8A
V13	1st AM IF Amplifier	6BA6
V14	2nd AM IF Amplifier	6BA6
V15	Channel A Preamplifier	ECC83/12AX7
V16	FM - Channel A AF Amplifier	ECC83/12AX7
V17	Channel B Preamplifier	ECC83/12AX7
V18	AM - Channel B AF Amplifier	ECC83/12AX7
V19	Rectifier	EZ81/6CA4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	300	24-123	AFH3-25-50	C0194	FP227.5	TMD-38	TVL-3583	
B	■80	250				TC58	TD-80-350		
C	▲40	250							
C2A	▲40	250	24-123		C0194	FP227.5	TMD-38	TVL-3583	
B	▲40	300				TC78	TD-80-350		
C	■80	250							
C3A	▲10000	25	24-162		A0130		TMD-21	TVLS-3290 *	
B	■200	25			BR2502		TD-1000-25		
C	▲200	25			BR2502				

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	4-14 N080							
C5	50 N750 10%		N750-DI 47	TCN-50	C10Q5U	CCTN-470	CN7-447	10TCU-Q47
C6	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C7	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C8	50 N750 10%		N750-DI 47	TCN-50	C10Q5U	CCTN-470	CN7-447	10TCU-Q47
C9	50 N750 10%		N750-DI 47	TCN-50	C10Q5U	CCTN-470	CN7-447	10TCU-Q47
C10	4-14 N080							
C11	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C12	1-8			829-10				
C13	100 NPO		NPO-SI 100	TCZ-100	C10T1C	CCTO-101	CNO-310	10TCC-T10
C14	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C15	22 N750 10%		N750-DI 22	DTN-22	C10Q22U	CCTN-220	CN7-422	10TCU-Q22
C16	800		BPD-0008	DD-801	L10T8	CCD-801	GP382	10TS-T80
C17	5 N750 10%			DTN-5	C10V5U	CCTN-050	CN7-550	10TCU-V50
C18	1500		BPD-0015	DD-152	BYA10D15	CCD-152	GP215	10TS-D15
C19	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C20	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C21	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C22	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C23	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C24	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C25	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C26	100 N150 10%					■		10TCP-T10
C27	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C28	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C29	5000		BPD-005	DD-503	BYA10D5	CCD-502	GP250	5HK-D50
C30	5 N750 10%			DTN-5	C10V5U	CCTN-050	CN7-550	10TCU-V50
C31	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C32	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C33	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C34	1000 10%		DI-1000	DD-102	1R5D1	CCD-102	GP210	10TS-D10
C35	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C36	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C37	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C38	5000		BPD-005	DD-502	BYA10D5	CCD-502	GP250	5HK-D50
C39	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C40	1500 10%		DI-1500	DD-152	1R5D15	CCD-152	GP215	10TS-D15
C41	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C42	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C43	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C44	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C45	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C46	100 N1500			TCL-100		■		
C47	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C48	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C49	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C50	56 NPO 10%			TCZ-56	C10Q56C	CCTO-560	CNO-456	10TCC-Q56
C51	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C52	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C53	20 NPO 10%		NPO-DI 20	TCZ-20	C10Q2C	CCTO-200	CNO-422	10TCC-Q20
C54	510 5%		1469-00051		5R5T51	CM-19B-511J	MCE245	MS-351
C55	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C56	5 N750 10%			DTN-5	C10V5U	CCTN-050	CN7-550	10TCU-V50
C57	50 N750 10%		N750-DI 47	TCN-50	C10Q5U	CCTN-470	CN7-447	10TCU-Q47
C58	800		BPD-0008	DD-801	L10T8	CCD-801	GP382	10TS-T80
C59	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C60	510 5%		1469-00051		5R5T51	CM-19B-511J	MCE245	MS-351
C61	510 5%		1469-00051		5R5T51	CM-19B-511J	MCE245	MS-351
C62	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C63	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C64	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C65	510 5%		1469-00051		5R5T51	CM-19B-511J	MCE245	MS-351
C66	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C67	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C68	50 N750 10%		N750-DI 47	TCN-50	C10Q5U	CCTN-470	CN7-447	10TCU-Q47
C69	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C70	100 N1500			TCL-100		■		
C71	500 10%		BPD-0005	DD-501	5R5T5	CCD-501	GP350	10TS-T50
C72	2200 5%		1464-0022		1R5D22	CM-20B-222J	MCJ459	MS-222
C73	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C74	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C75	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C76	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C77	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C78	1500 10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C79	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C80	3300 10%		DI-3300		PM6D33	CCD-332	JL-233	10TS-D33
C81	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C82	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C83	1500 10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C84	1500 10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C85	250 N1500 10%					■		
C86	500 10%		DI-500	DD-501	5R5T5	CCD-501	GP350	10TS-T50
C87	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C88	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C89	.1 200V		P288N-1	DF-104	CUB4P1	2DP-3-104	GEM-201	2TM-P1
C90	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C91	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1
C92	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47

PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C93	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C94	1500 10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C95	1000 10%		DI-1000	DD-102	PM6D1	CCD-102	GP210	10TS-D10
C96	3300 10%		DI-3300		PM6D33	CCD-332	JL-233	10TS-D33
C97	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C98	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C99	1500 10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C100	1500 10%		DI-1500	DD-152	PM6D15	CCD-152	GP215	10TS-D15
C101	250 N1500 10%					*		
C102	500 10%		DI-500	DD-501	5R5T5	CCD-501	GP350	10TS-T50
C103	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C104	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C105	.1 200V		P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P1
C106	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C107	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C108	10000		BPD-01	DD-103	BYA10S1	CCD-103	GP110	5HK-S10
C109	30 2000V		HVD-30-33	DD30-300	HVA20Q33	3CCD-330	2DY-433	30GA-Q33

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PILOT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg	1/2	36-71					Volume, Channel A
B	100K	1/2						Volume, Channel A
	50K tap							
C	1meg	1/2						Volume, Channel B
D	100K	1/2						Volume, Channel B
	50K tap							
R2A	1meg	1/2	37-39	B-69	AD47-1meg-S			Treble, Channel A
B	1meg	1/2		SR-69	Not Req.		■ UE1707	Treble, Channel B
C	Shaft			Not Req.	FS-3			
R3A	1meg	1/2	37-39	B-69	AD47-1meg-S			Bass, Channel A
B	1meg	1/2		SR-69	Not Req.		■ UE1707	Bass, Channel B
C	Shaft			Not Req.	FS-3			
R4A	1meg	1/2	39-57					Balance, Channel A
B	1meg	1/2					▲ UE4008	Balance, Channel B
R5A	10K	1/2	39-46	AB-14	B47-10K-S	B11-116	SU-20	10KC Filter
B	Shaft			AK-1	Not Req.	TM4	Not Req.	
R6A	10K	1/2	39-46	AB-14	B47-10K-S	B11-116	SU-20	FM Meter Center Set
B	Shaft			AK-1	Not Req.	TM4	Not Req.	
R7A	5000Ω	1/2	39-42	BX-10	B47-5000-S	B11-114	SU-14	Muting Threshold
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	

■ "STA-LOC" Equivalent: FA16L, RU16L, CS3500.
▲ "STA-LOC" Equivalent: FA16A, RU16R, CS3500.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R8	270K	
R9	270Ω	
R10	1meg	
R11	15K	
R12	6800Ω	
R13	12K	
R14	1000Ω	
R15	15K	
R16	68Ω	
R17	1000Ω	
R18	220K	
R19	220K	
R20	15K	
R21	1000Ω	
R22	1meg	
R23	270K	(220K) *
R24	68K	
R25	12K	
R26	270Ω	
R27	6800Ω	
R28	12K	
R29	4700Ω	
R30	6800Ω	
R31	33K	
R32	180Ω	
R33	1000Ω	
R34	27K	
R35	270Ω	
R36	100K 5%	
R37	100K 5%	
R38	39K	
R39	68K	
R40	1meg	
R41	2200Ω	
R42	220K	
R43	100K	
R44	2.2meg	
R45	680K	
R46	100K	
R47	470K	
R48	39K	
R49	3300Ω	
R50	1500Ω	
R51	15K 2W	
R52	270K	
R53	18K	
R54	680Ω	
R55	120Ω	
R56	470Ω	
R57	2.2meg	
R58	18K	
R59	1000Ω	
R60	22K	
R61	6800Ω	
R62	18K	
R63	1000Ω	
R64	270K	
R65	470K	
R66	18K	
R67	1000Ω	
R68	39K	
R69	82K	
R70	27K	
R71	47K	
R72	100K	
R73	1meg	
R74	82K 1W	
R75	2200Ω 1W	
R76	100K 5%	
R77	1.8meg	

* Alternate value.

RESISTORS (cont)

ITEM No.	RATING	REMARKS
R78	1.8meg	
R79	27K 5%	
R80	2.2meg	
R81	82K 1W	
R82	2.2meg	
R83	100K 5%	
R84	3.3meg	
R85	82K 1W	
R86	100K 1W	
R87	330Ω 1W	
R88	100K 5%	
R89	470K	
R90	100K 5%	
R91	1meg	
R92	82K 1W	
R93	100K 1W	
R94	680Ω 1W	
R95	220K	
R96	470Ω	
R97	10K	
R98	47K	
R99	100K	
R100	1meg	
R101	82K 1W	
R102	2200Ω 1W	
R103	2.2meg	
R104	82K 1W	
R105	100K 5%	
R106	1.8meg	
R107	1.8meg	
R108	27K 5%	
R109	4.7meg	
R110	2.2meg	
R111	100K 5%	
R112	3.3meg	
R113	82K 1W	
R114	100K 1W	
R115	330Ω 1W	
R116	100K 5%	
R117	470K	
R118	100K 5%	
R119	1meg	
R120	82K 1W	
R121	100K 1W	
R122	680Ω 1W	
R123	220K	
R124	120Ω	
R125	39K	
R126	470Ω	
R127	10K	
R128	470Ω	
R129	1500Ω 1W	
R130	3300Ω 1W	
R131	220Ω 7W	
R132	220Ω 7W	
R133	680Ω	
R134	680Ω	
R135	330Ω	
R136	100K	
R137	270Ω	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		PILOT PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	FM Antenna Coil	70-85						
L2	FM Antenna Coil	70-84						
L3	RF Choke	75-52	19-2002	19-2002		4582		.15uh
L4	Cathode Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L5	RF Choke	75-33	19-1004	19-1004	SW-631	4529		5uh
L6	RF Choke							①
L7	FM RF Coil	71-46						
L8	Fil. Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L9	Fil. Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L10	Cathode Choke	75-33	19-1004	19-1004	SW-631	4529		5uh
L11	FM Osc. Coil	72-81						
L12	1st FM IF	273-151	16-3487	16-3487	FM-254	1463		
L13	2nd FM IF	273-151	16-3487	16-3487	FM-254	1463		
L14	3rd FM IF	273-151	16-3487	16-3487	FM-254	1463		
L15	4th FM IF	273-151	16-3487	16-3487	FM-254	1463		
L16	RF Choke	75-51	19-3075	19-3075	TV-186	6172	VP-2	80uh
L17	5th FM IF	273 154						
L18	Discriminator	279-78						
L19	Loopstick	270-56						
L20	AM IF Trap Coil	79-102						
L21	AM RF Coil	71-43						
L22	AM Osc. Coil	72-78			BC-393			
L23	1st AM IF	273-152						
L24	2nd AM IF	273-152						
L25	3rd AM IF	273-129	16-6758	16-6758	BC-353	12-C2	RF-2	
L26	Fil. Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L27	Fil. Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L28	Line Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L29	Line Choke	75-19	19-1001	19-1001	BC-562	4604		1.6uh
L30	10KC Filter Choke	79-106						120MH

① 3 Turns wire on 330Ω resistor.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	PILOT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .95A	460VCT @ .135A	6.3V @ 3.7A	55-70						
	SEC. 3	SEC. 4	SEC. 5							
	24VCT @ .6A	6.3VCT @ .9A								

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT (Measured)	PILOT PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.590A	110-470 ①			4N33-1C1-RV①		① Selenium Type

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		PILOT PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N541 *		1N60	1N295	1N295	Discriminator } Matched
M3	1N541 *		1N60	1N295	1N295	Discriminator } Pair
M4	1N541		1N60	1N295	1N295	FM AFC
M5	1N541		1N60	1N295	1N295	AM Detection, AGC

* Alternate Type 1N542.

MISCELLANEOUS

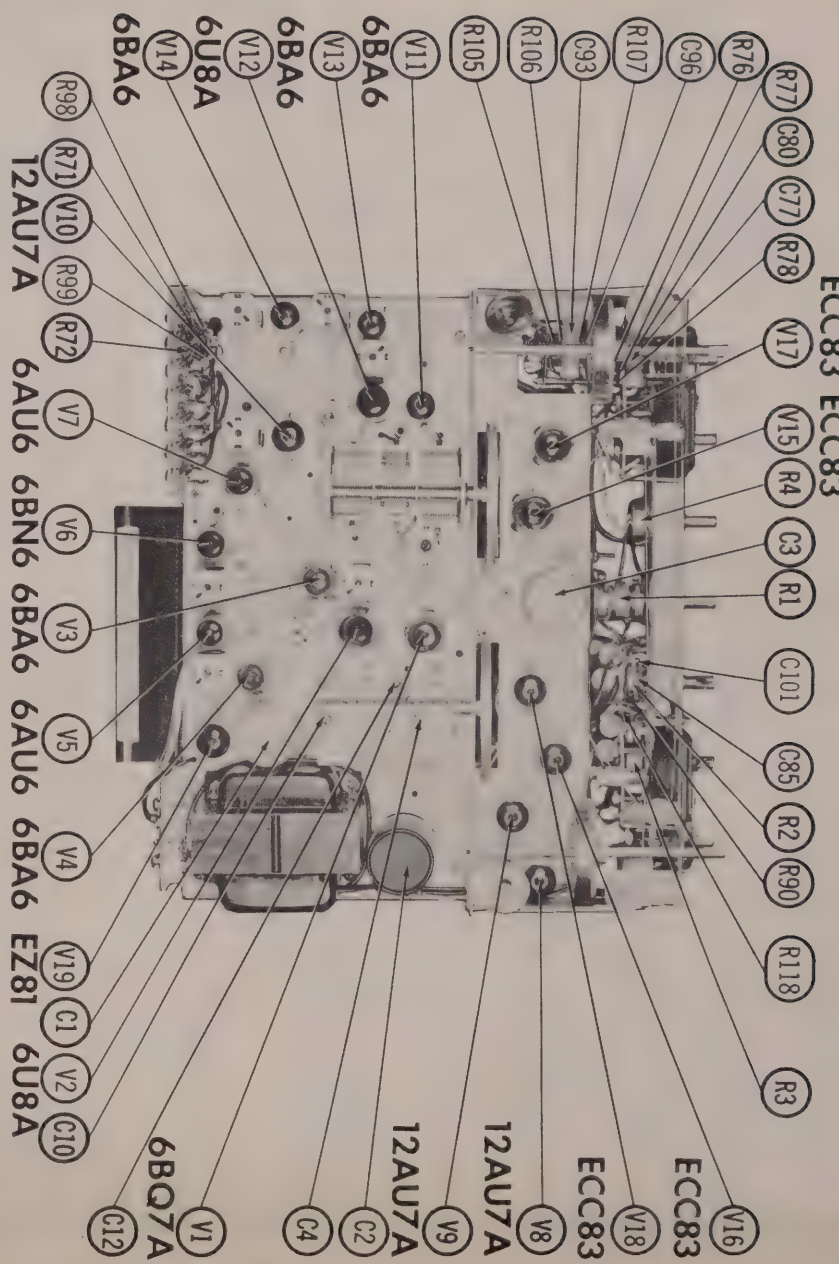
ITEM No.	PART NAME	PILOT PART No.	NOTES
M6	Tuning Cap.	26-62	AM, 3 Gang (Ant. 8-508mmf, RF 8-508mmf, Osc. 7-135mmf)
M7	Tuning Cap.	26-63	FM, 2 Gang
M8	Switch	100-142	Power Off-On-Auto
M9	Switch	100-136	Function Selector
M10	Switch	100-143	Mode
M11	Switch	100-41	Muting SPDT Slide Type
M12	Switch	101-26	AM Bandwidth DPDT Slide Type
M13	Meter	110-582	FM Tuning
M14	Meter	110-584	AM Tuning

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—TOP VIEW



PHOTOFACT® Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

V-M MODELS
564, 811

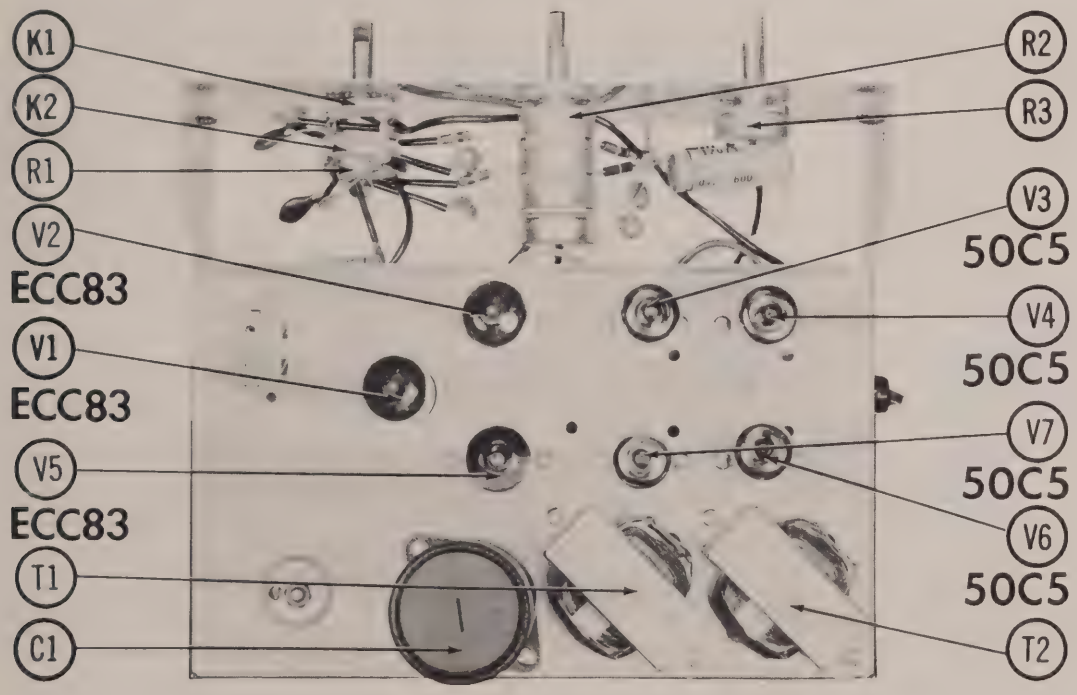
V-M MODELS
564, 811

MODEL 811

TRADE NAME	V-M Models 564, 811
MANUFACTURER	V-M Corp., Benton Harbor, Michigan
TYPE SET	AC Operated 7 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 53 Watts, .59 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER — SEE V-M 1201 — PHOTOFACT SET 436 FOLDER 18

V-M MODELS
564, 811



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JT488

SET 477 FOLDER 12

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel A AF Amp. - Channel B AF Amp.	ECC83/12AX7 (7025) *	V4	Channel A Output	50C5
V2	Channel A AF Amp. - Phase Inv.	ECC83/12AX7 (7025) *	V5	Channel B AF Amp. - Phase Inv.	ECC83/12AX7 (7025) *
V3	Channel A Output	50C5	V6	Channel B Output	50C5
			V7	Channel B Output	50C5

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	V-M PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲150	200	12121		XBO252	FP217, 74	TMD-88	TVL-2538	
B	■200	200			BBRD3325	TCD2274	TDLD-22	TVA-2740	
C	▲50	200							
D	50	200							

FIXED CAPACITORS

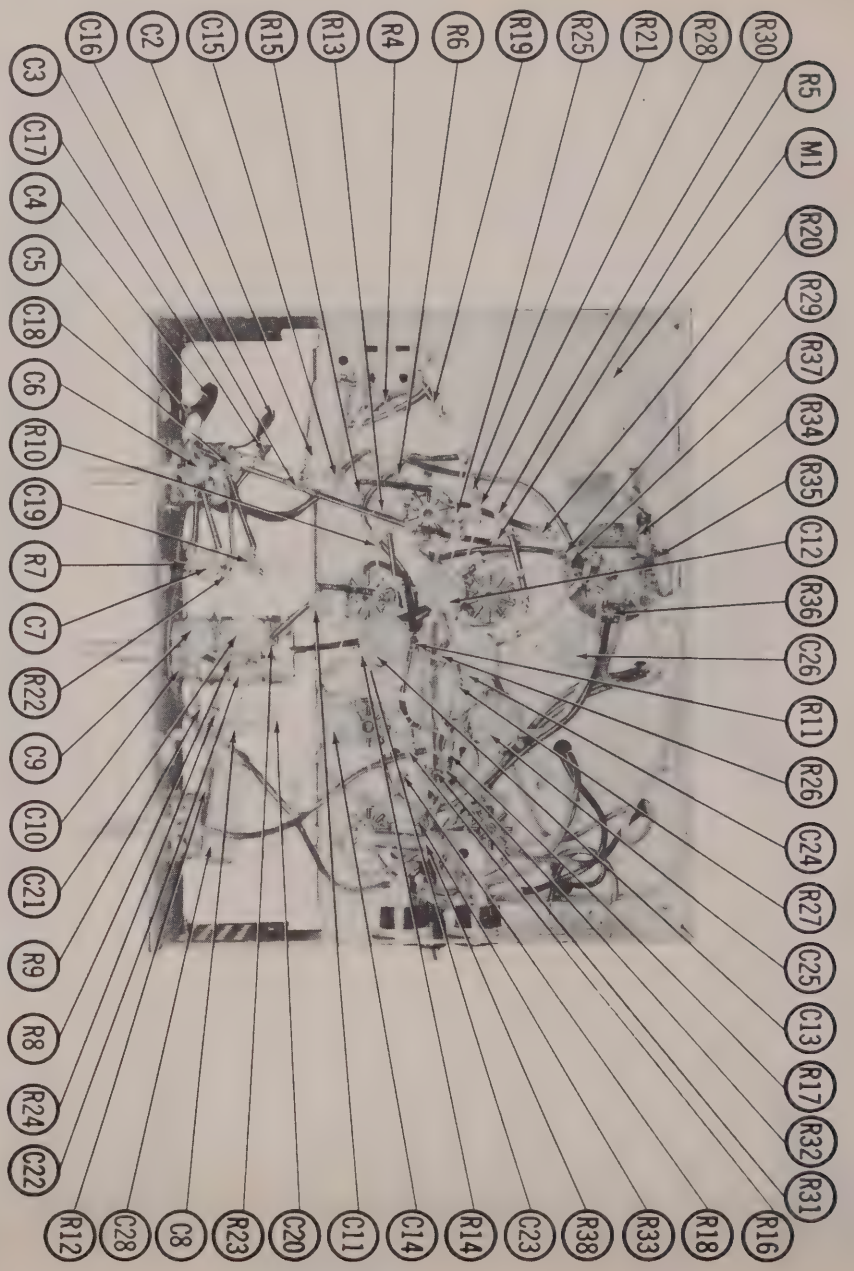
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.047 600V		P688N-047	DD-503	CUB6S47	6DP-4-473	GEM-6147	6TM-S47
C3	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C4	200 10%		DI-200	DD-201	L10T2	CCD-201	GP320	10TS-T20
C5	33		DI-33	DD-330	L10Q33	CCD-330	GP433	10TS-Q33
C6	10		DI-10	DD-100	L10Q1	CCD-100	GP410	10TS-Q10
C7	100		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C8	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C9	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C10	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C11	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C12	22000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C13	22000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C14	22000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C15	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C16	200 10%		DI-200	DD-201	L10T2	CCD-201	GP320	10TS-T20
C17	33		DI-33	DD-330	L10Q33	CCD-330	GP433	10TS-Q33
C18	10		DI-10	DD-100	L10Q1	CCD-100	GP410	10TS-Q10
C19	100		DI-100	DD-101	L10T1	CCD-101	GP310	10TS-T10
C20	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C21	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C22	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C23	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C24	22000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C25	22000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C26	22000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C27	2mfd 100V		P282Z-2.0		MP2W2			118P20502S2
C28	.047 600V		P688N-047	DD-503	CUB6S47	6DP-4-473	GEM-6147	6TM-S47

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	V-M PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	1meg 330K Tap 650K Tap	½	12386					Loudness, Channel A
B	1meg 330K Tap 650K Tap	½	12386				-	Loudness, Channel B
R2A	1meg	½	12387					Bass, Channel A
B	1meg	½						Bass, Channel B
C	1meg	½						Treble, Channel A
D	1meg	½						Treble, Channel B
R3A	1meg	½	12388	B-69	A47-1meg-S	Q11-137	U54	Balance
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	1meg	
R5	120K	(68K) *
R6	4700Ω	
R7	100K	
R8	180K	
R9	10K	
R10	1meg	
R11	220K	
R12	47K	
R13	4700Ω	
R14	220K	
R15	4700Ω	

ITEM No.	RATING	REMARKS
R16	220K	
R17	100K	
R18	220K	
R19	1meg	
R20	120K	(68K) *
R21	4700Ω	
R22	100K	
R23	180K	
R24	10K	
R25	1meg	
R26	220K	
R27	47K	

ITEM No.	RATING	REMARKS
R28	4700Ω	
R29	220K	
R30	4700Ω	
R31	220K	
R32	100K	
R33	220K	
R34	5.6Ω	
R35	5.6Ω	
R36	1000Ω	
R37	22K	
R38		#12389

* Alternate Value. # V-M Part Number.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	V-M PART No.	REPLACEMENT DATA
K1	Loudness Comp.	5000mmf, 5000mmf, 47K, 47K	12569	Note 1
K2	Loudness Comp.	5000mmf, 5000mmf, 47K, 47K	12569	Note 1

Note 1. Some versions may use individual parts in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	V-M PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	4600Ω CT	3-4Ω	12600-A	24S06	A-2901	AU-600	A-3823	24S06	S-53X	
T2	4600Ω CT	3-4Ω	12600-B	24S06	A-2901	AU-600	A-3823	24S06	S-53X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	V-M PART No.	QUAM PART No.	
SP1	12"	PM	3-4Ω	18560 ①	12A6A	① Model 811
SP2	3½"	PM	9-11Ω	18558 ①	3A15TZ9.8	② Model 564
	8"	PM		19752 ②		
	8"	PM		19753 ②		

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT (Measured)	V-M PART No.	INTERNATIONAL PART No.	ITT PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.068A	12601①	6RS250 ①	1028A①	250①	SR200②	① Selenium Type ② Silicon Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA									
	V-M PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M2	16708-A	13TB *	Not Req.	66 ‡	Not Req.			8TA4-S *	N-8TA-S

* Includes Mounting.
‡ Use Mount PT-3.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	V-M PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M3	19737-A	W-103STSS † or W-103STSS-1 † or W-103STDS ♦† or W-103STDS-1 ♦† or W-103STDD-1 ♦	S-69X † or S-69XSD †♦ or S-69XDD ♦	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	V-M PART No.	NOTES
M4	Switch	467	Off-On (Part of Changer)
M5	Motor Assembly	18361	Complete

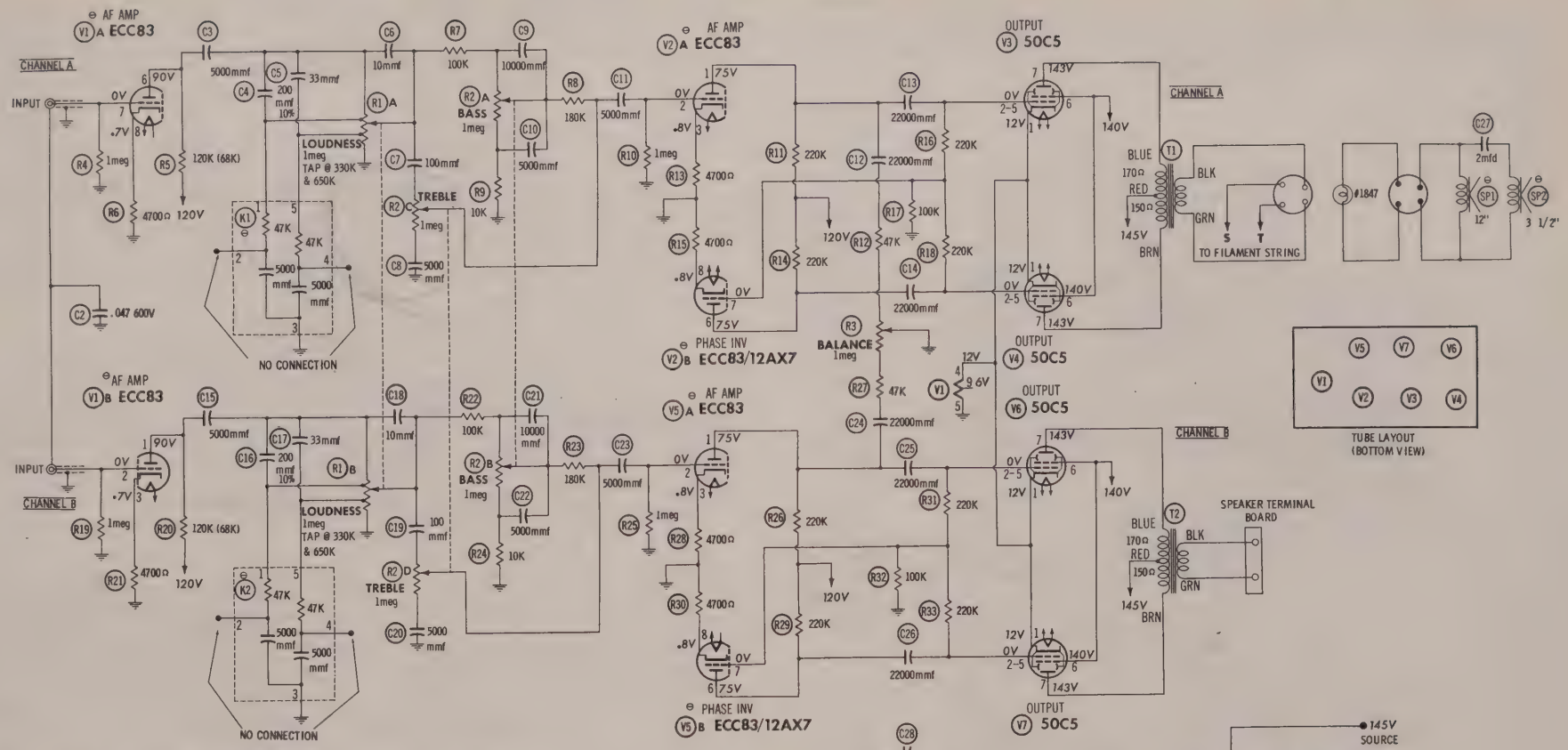
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	15136-B	Loudness, Balance, Model 564, Blond, Mahogany, Walnut Cabinets
Knob	15136-C	Loudness, Balance, Model 564, Ebony Cabinet
Knob	15135-B	Treble, Model 564, Blond, Mahogany, Walnut Cabinets
Knob	15135-C	Treble, Model 564, Ebony Cabinet
Knob	18354-B	Bass, Model 564, Blond, Mahogany, Walnut Cabinet
Knob	18354-A	Bass, Model 564, Ebony Cabinet
Cabinet	19701-B	Complete, Model 564, Blond
Cabinet	19701-M	Complete, Model 564, Mahogany
Cabinet	19701-W	Complete, Model 564, Walnut
Cabinet	19701-E	Complete, Model 564, Ebony
Cabinet	19695-B	Complete, Model 811, Blond
Cabinet	19695-W	Complete, Model 811, Walnut
Cabinet	19695-M	Complete, Model 811, Mahogany

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	†140K	1meg	4700Ω	12Ω	0Ω	†140K	1meg	4700Ω	6Ω
V2	ECC83 12AX7	†240K	1meg	4700Ω	7.5Ω	7Ω	†240K	100K	4700Ω	0Ω
V3	50C5	12Ω	320K	60Ω	7Ω	320K	†1000Ω	†175Ω		
V4	50C5	12Ω	320K	120Ω	60Ω	320K	†1000Ω	†155Ω		
V5	ECC83 12AX7	†240K	1meg	4700Ω	20Ω	7.5Ω	†240K	100K	4700Ω	15Ω
V6	50C5	12Ω	320K	140Ω	90Ω	320K	†1000Ω	†175Ω		
V7	50C5	12Ω	320K	90Ω	20Ω	320K	†1000Ω	†155Ω		

† MEASURED FROM OUTPUT OF M1.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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V-M MODELS 564, 811

PHOTOFACT® Folder

**WEBSTER ELECTRIC
MODEL SS693A**

WEBSTER ELECTRIC
MODEL SS693A

WEBSTER ELECTRIC
MODEL SS693A

TRADE NAME	Webster Electric Model SS693A		
MANUFACTURER	Webster Electric Co., Racine, Wisconsin		
TYPE SET	AC Operated 5 Tube Stereo Playback Preamplifier		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	17 Watts, .21 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1960 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

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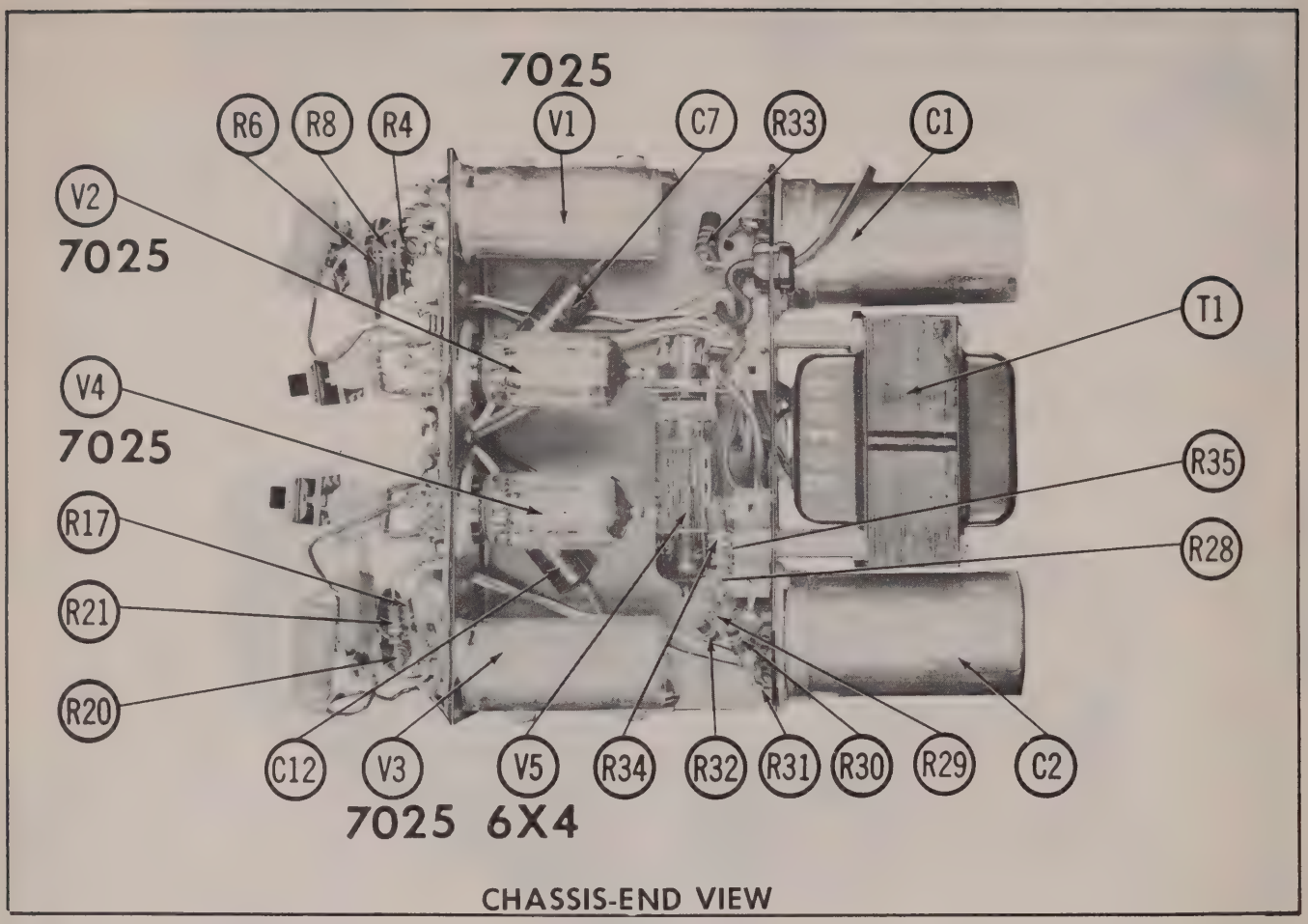
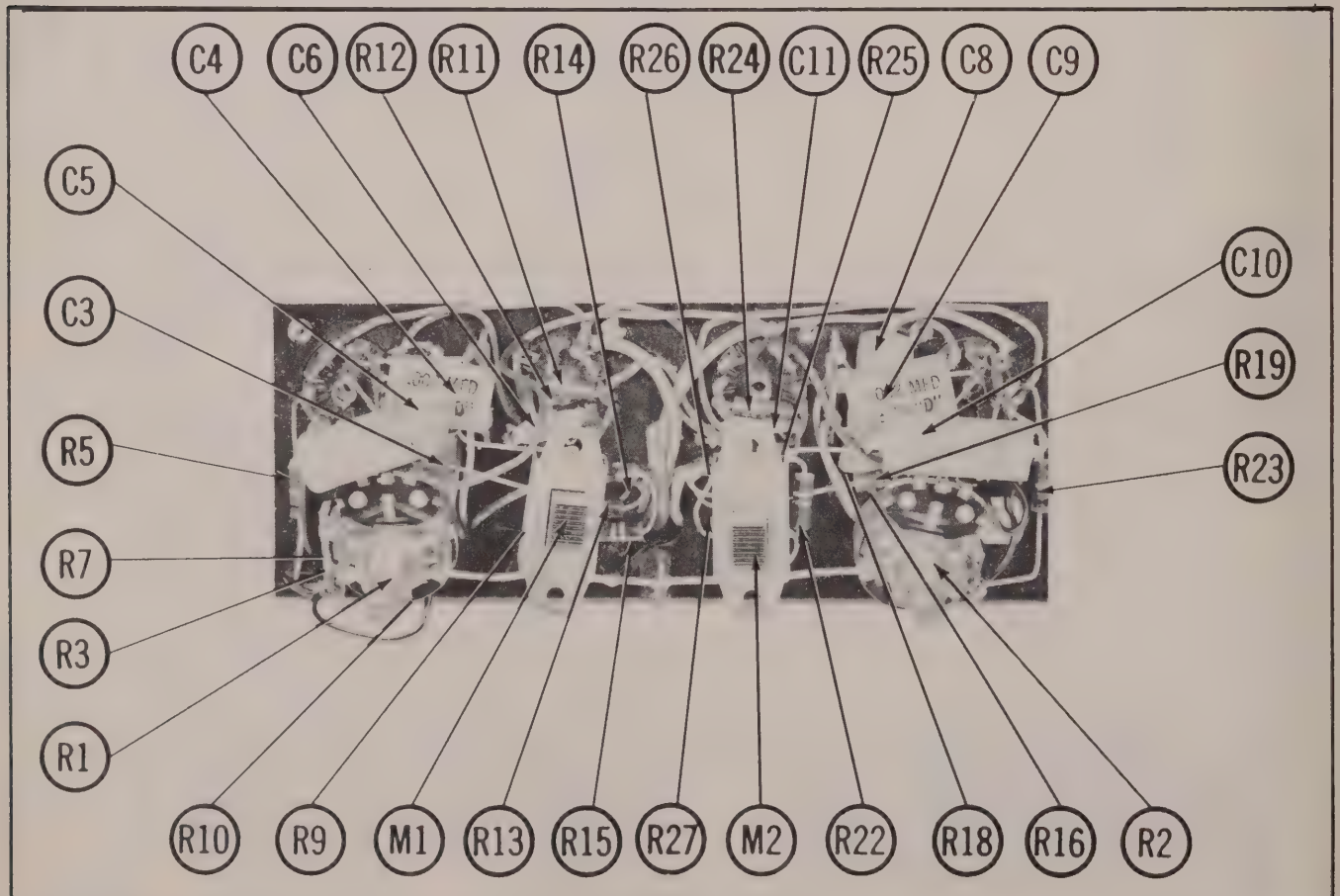


CHASSIS-END VIEW



CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

• CBS • GENERAL ELECTRIC • RAYTHEON • SYLVANIA •					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel A AF Amplifier	7025	V4	Channel B AF Amp. - Channel B Cath. Follower	7025
V2	Channel A AF Amp. - Channel A Cath. Follower	7025	V5	Rectifier	6X4
V3	Channel B AF Amplifier	7025			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA WEBSTER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	241-14236	AFH2-57	B0450	FP238	TMD-54	TVL-2764	
B	▲40	450							
C2A	▲20	350	241-26133	AFH4-06	D0174	FP447	TMQ-7	TVL-4773	
B	■35	350							
C	20	350							
D	▲35	350							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	.047 400V		P488N-047	DF-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C4	2000 2%					CM-20E-202G	MCE457	MS-32
C5	.047 400V		P488N-047	DF-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C6	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C7	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C8	.047 400V		P488N-047	DF-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C9	2000 2%					CM-20E-202G	MCE457	MS-32
C10	.047 400V		P488N-047	DF-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C11	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C12	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA WEBSTER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	S3911	AB-60	A47-500K-Z	Q13-133	U48	Level, Channel A
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	
R2A	500K	½	S3911	AB-60	A47-500K-Z	Q13-133	U48	Level, Channel B
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	470K	
R4	100K	
R5	2000Ω 5%	
R6	51K 5%	
R7	470K	
R8	100K	
R9	75K 5%	
R10	2000Ω 5%	
R11	51K 5%	
R12	3600Ω 5%	
R13	1meg	

ITEM No.	RATING	REMARKS
R14	2000Ω 5%	
R15	100K	
R16	470K	
R17	100K	
R18	2000Ω 5%	
R19	51K 5%	
R20	470K	
R21	100K	
R22	75K 5%	
R23	2000Ω 5%	
R24	51K 5%	

ITEM No.	RATING	REMARKS
R25	3600Ω 5%	
R26	1meg	
R27	2000Ω 5%	
R28	100K	
R29	100K	
R30	10K	
R31	100K	
R32	10K	
R33	5100Ω 5% 1W	
R34	120K 1W	
R35	3600Ω 5%	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA WEBSTER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .21A	440VCT @ .012A	6.3V @ .6A	26129 ①						
	SEC. 3	SEC. 4	SEC. 5							
	6.3VCT @ 1.2A									

① Alternate Part #RE7936.

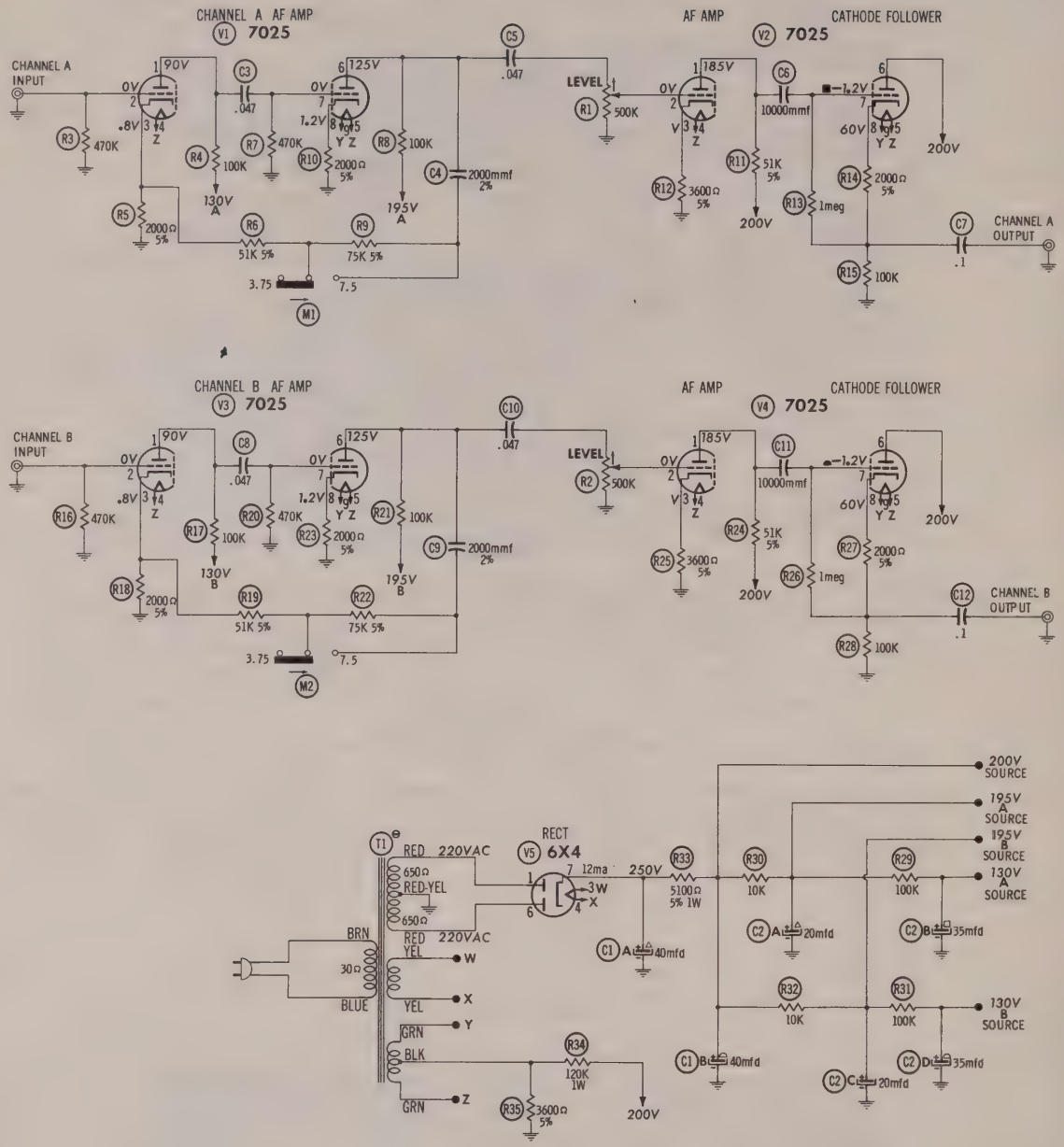
MISCELLANEOUS

ITEM No.	PART NAME	WEBSTER PART No.	NOTES
M1	Switch		Speed Compensating, Channel A (SPDT, Slide Type)
M2	Switch		Speed Compensating, Channel B (SPDT, Slide Type)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	7025	†215K	470K	2000Ω	3500Ω	3500Ω	†115K	470K	2000Ω	3500Ω
V2	7025	†55K	0Ω	3600Ω	3500Ω	3500Ω	†5100Ω	1.1meg	100K	3500Ω
V3	7025	†215K	470K	2000Ω	3500Ω	3500Ω	†115K	470K	2000Ω	3500Ω
V4	7025	†55K	0Ω	3600Ω	3500Ω	3500Ω	†5100Ω	1.1meg	100K	3500Ω
V5	6X4	650Ω	NC	INF	INF	NC	650Ω	¶		

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V5.
■ MEASURED FROM PIN 8 OF V2.
▪ MEASURED FROM PIN 8 OF V4.
NC NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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WEBSTER ELECTRIC
MODEL SS693A

PHOTOFACT® Folder with CIRCUITRACE®

EIA MEMBER

WESTINGHOUSE MODEL H-690P5 (Ch. V-2397-1)

WESTINGHOUSE MODEL
H-690P5 (Ch. V-2397-1)

TRADE NAME	Westinghouse Model H-690P5 (CH. V-2397-1)
MANUFACTURER	Westinghouse Electric Corp. Metuchen, N. J.
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	6 Volts DC
TUNING RANGE—BROADCAST	540 - 1625KC
RATING	7.2MA@6 Volts DC (No Signal, Min. Volume) 8MA@6 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:

A1, A3. ..... GENERAL CEMENT # 8607, 9291
WALSCO #2520, 2522, 2523, 2524, 2537

A2, ... GENERAL CEMENT #9440

A4, A5..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

A6..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1625KC	"	"	A4	"
3.		"	1400KC	1400KC Signal	"	A5	"
4.		"	600KC	600KC Signal	"	A6	If necessary, adjust for maximum output. Repeat Steps 2, 3, & 4.

DISASSEMBLY INSTRUCTIONS

1. Remove volume control knob by pulling off.
2. Remove tuning knob by looping a string under knob and pulling.
3. Remove phillips head screw behind tuning knob.
4. Loosen two screws from cabinet back. Remove back.
5. Remove two hex head screws holding chassis.
6. Remove chassis and battery holder from cabinet.
7. Remove two screws holding speaker. Remove speaker.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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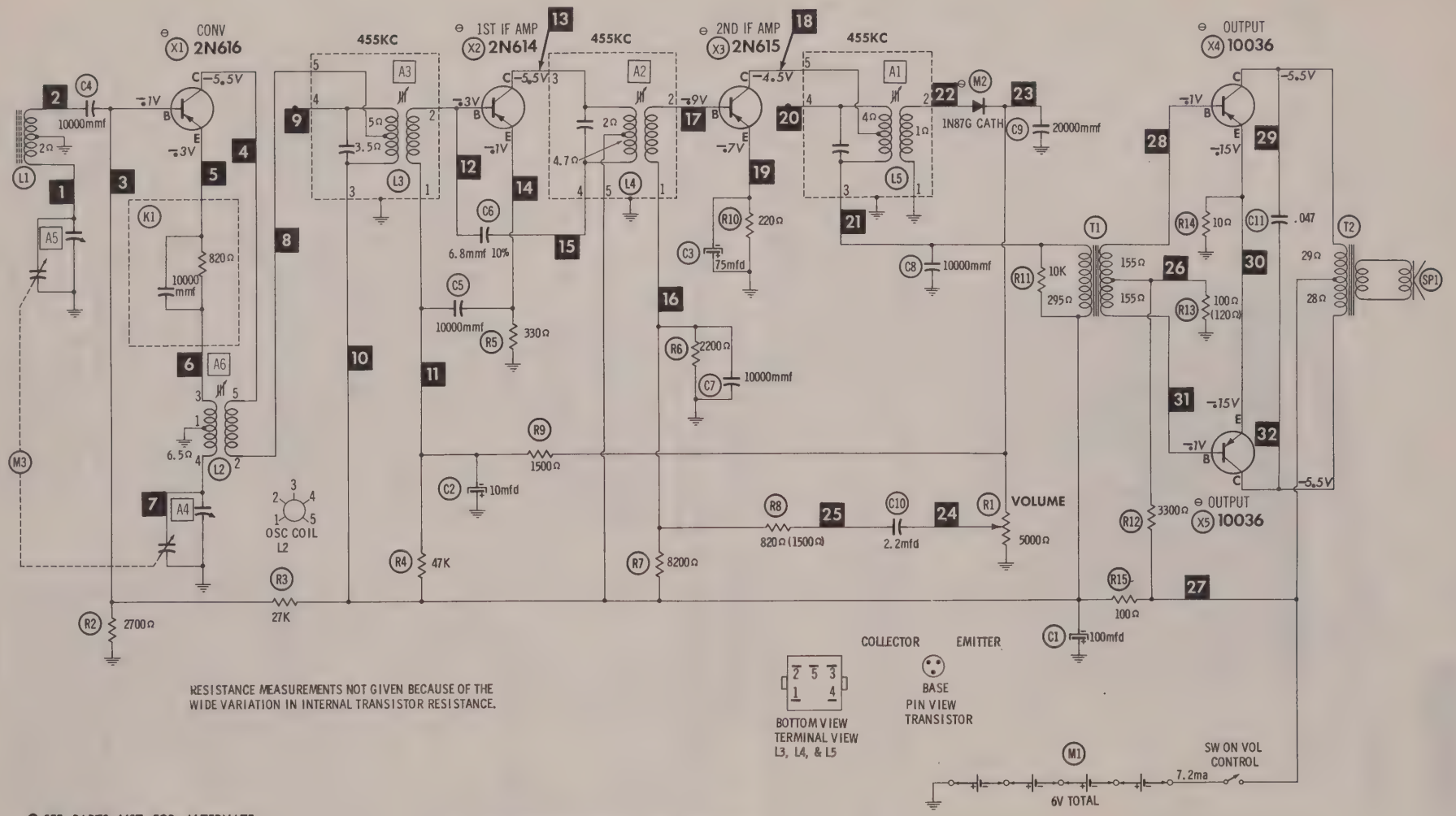
SET 477 FOLDER 14



RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

WESTINGHOUSE MODEL H-690P5 (Ch. V-2397-1)

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N616 ①	Converter		2N412	2N486	2N412	PNP
X2	2N614 ②	1st IF Amplifier		2N410	2N483	2N410	PNP
X3	2N615 ②	2nd IF Amplifier		2N410	2N483	2N410	PNP
X4	10036 ③	Output		2N109	2N632	2N408	PNP } Matched
X5	10036 ③	Output		2N109	2N632	2N408	PNP } Pair

① Alternate Types 2N617, 2N412
② Alternate Type 2N410
③ Alternate Types 10037, 10038, 10039, 0060, 0061, 2N60, 2N61, 2N185, 2N408

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	100	7	218V012H15	PWE10100	EC100-10	TT15X100	ML100-6	TE-1119.3	
C2	10	3	218V012H16	PWE3010	EC10-3	TT3X10	ML10-6	TE-1053	
C3	75	3	218V012H17	PWE3100	EC75-6	TT6X80	ML75-3	TE-1059	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C5	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C6	6.8 10%		NPO-SI 6.8	TCZ-6R8	L10V68	CCTO-6R8	ZT5568	10TS-V68
C7	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C8	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C9	20000		BPD-02	DD-203	BYA10S2	CCD-203	B-120	5HK-S2
C10	2.2mfd 3V		P292ZN-2		WMF1W2E		GTM12	HY150
C11	.047 200V		P288N-047	DF-503	STM1S47	4DP-3-473	GTM2147	2TM-S47

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	½	270V050H03					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	2700Ω	
R3	27K	
R4	47K	
R5	330Ω	Note 1
R6	2200Ω	

ITEM No.	RATING	REMARKS
R7	8200Ω	(1500Ω) *
R8	820Ω	
R9	1500Ω	
R10	220Ω	
R11	10K	

ITEM No.	RATING	REMARKS
R12	3300Ω	(120Ω) *
R13	100Ω	
R14	10Ω	
R15	100Ω	

* Alternate value
Note 1. When X2 is type 2N410, 150Ω is used in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		Westinghouse PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	310V048H01						
L2	Osc. Coil	230V057H01						
L3	1st IF Trans.	235V041H01						
L4	2nd IF Trans.	235V041H04						
L5	3rd IF Trans.	235V041H03						

PRINTED BOARD

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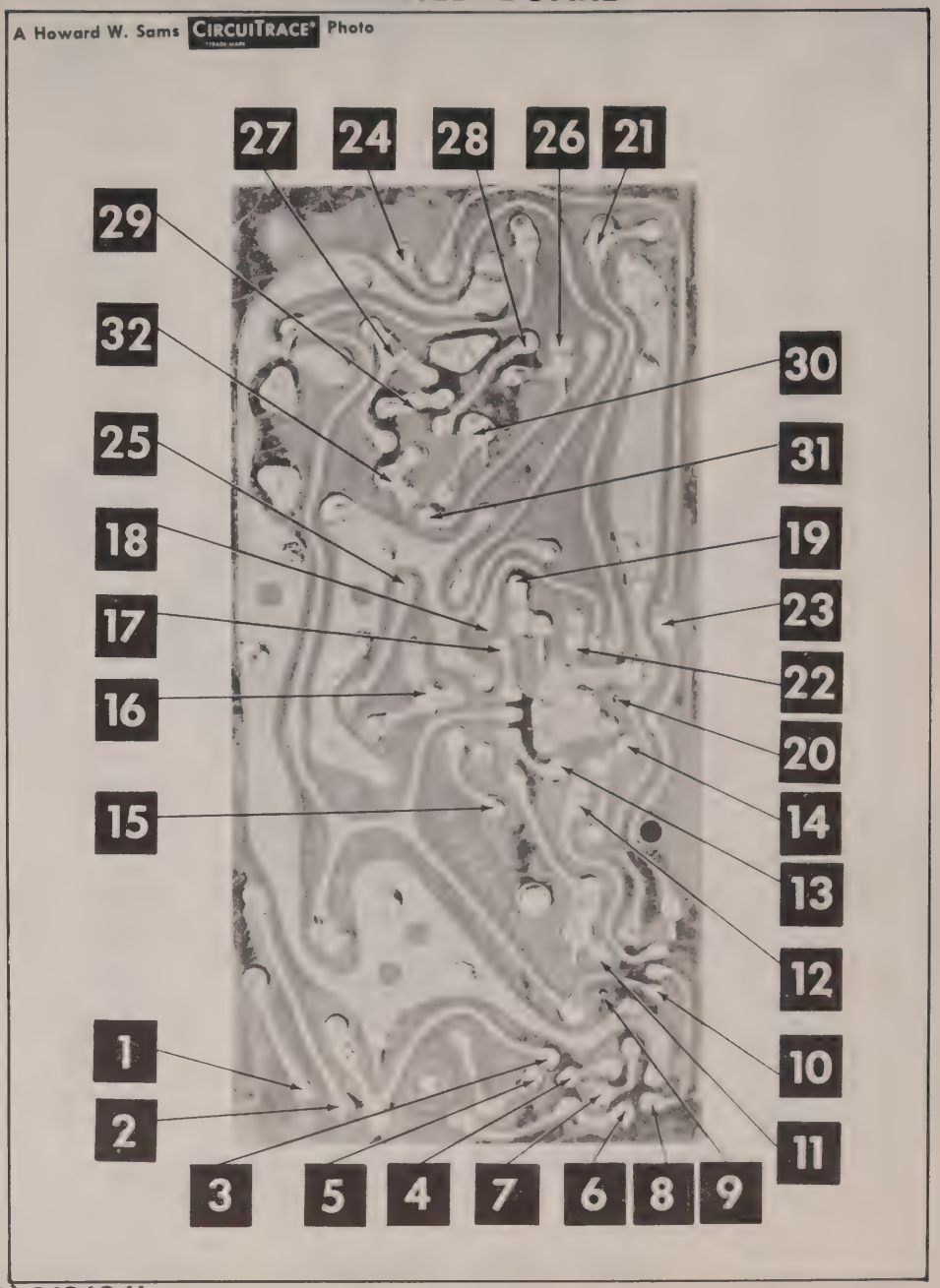


PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.3	1	430V054H01						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	600Ω CT	3-4Ω	430V055H01							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	570V061H01	4A07	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Westinghouse PART No.	REPLACEMENT DATA
K1	Converter Emiter	10000mmf, 820Ω	219V004H04	

BATTERIES

ITEM No.	VOLTAGE	Westinghouse PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V			130 ①		635 ①		M14R①	① 4 Required

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		Westinghouse PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N87G *	296V002H01	1N60	1N60	1N295	Detector, (Pigtail)

* Some versions may use 1N295 in this application.

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M3	Tuning Cap.	330V027H01	2 Gang

CABINETS & CABINET PARTS

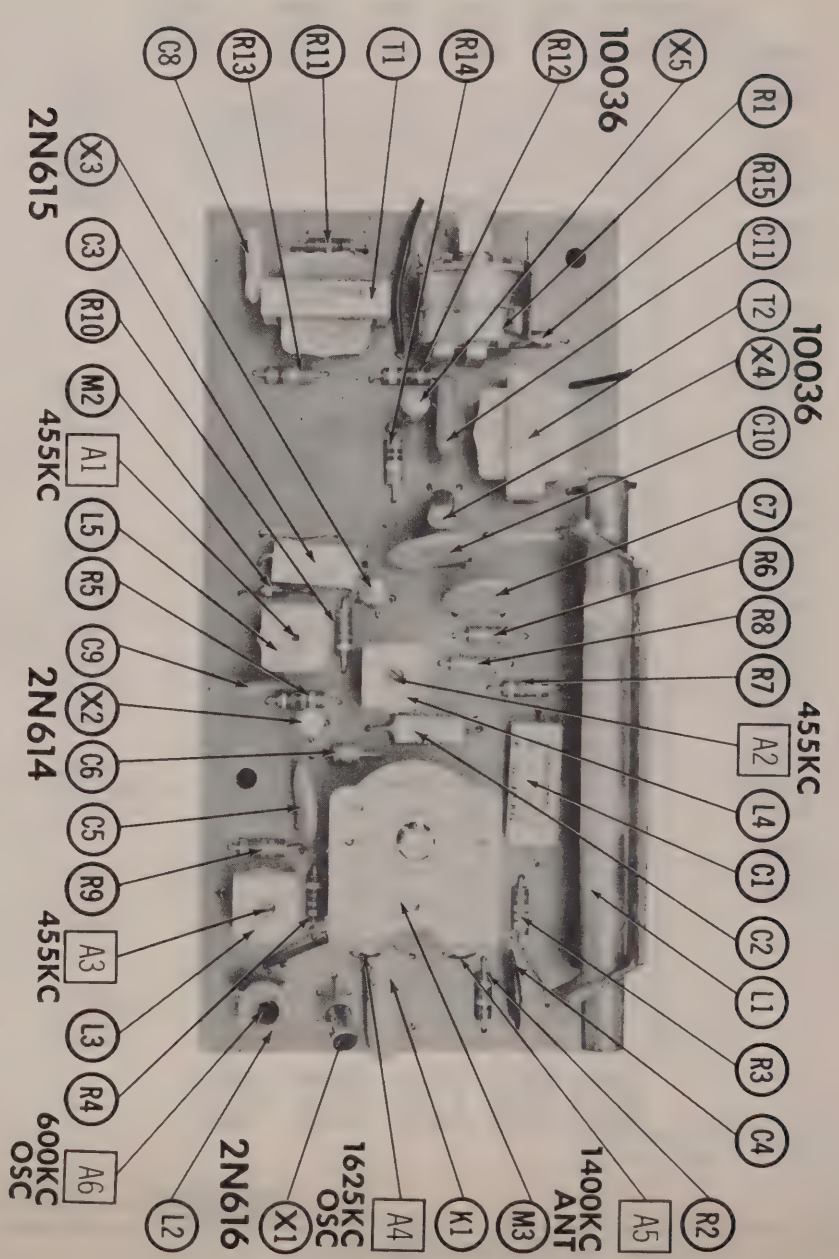
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	550V080H02	Tuning
Knob	550V098H02	Volume
Cabinet Front	513V039H01	
Cabinet Back	513V039H02	
Handle	558V217H01	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT® Folder

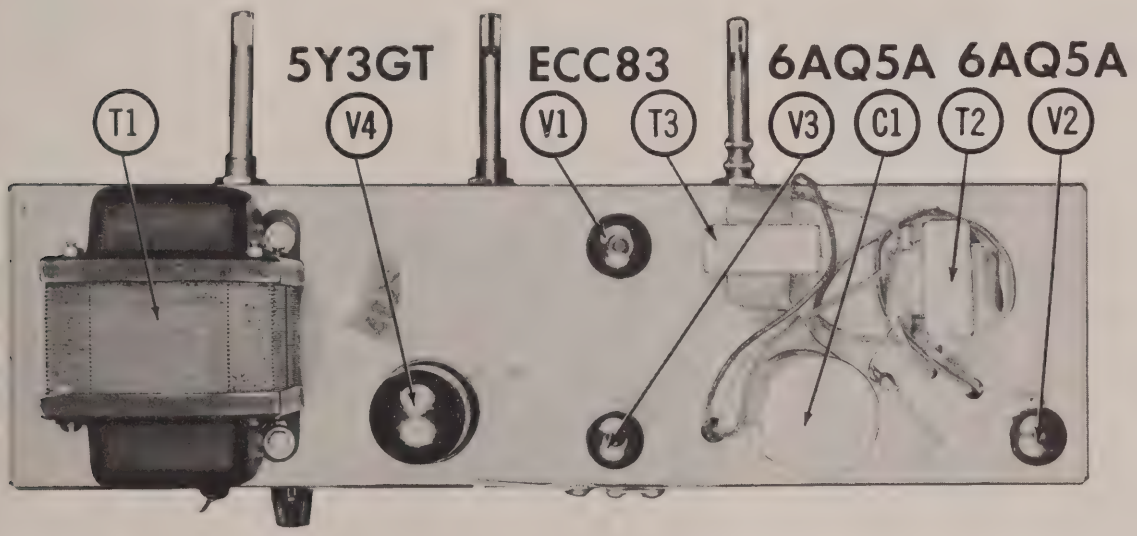
ZENITH MODELS SF112E, R, W, SRS2E, R, W (Ch. 4B25)

ZENITH MODELS SF112E, R, W, SRS2E, R, W (Ch. 4B25)

MODEL SF112R

TRADE NAME	Zenith Models SF112E, R, W, (Ch. 4B25), SRS2E, R, W (Remote Speaker)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	AC Operated 4 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 45 Watts, .46 Amp. @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER S-14091 or 169-106 - SEE SIMILAR ZENITH S-14078 - PHOTOFACT SET 392 FOLDER 14.



ZENITH MODELS SF112E, R, W, SRS2E, R, W (Ch. 4B25)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JT403

SET 477 FOLDER 15

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Left Channel AF Amp. - Right Channel AF Amp.	ECC83/12AX7	V3	Right Channel Output	6AQ5A
V2	Left Channel Output	6AQ5A	V4	Rectifier	5Y3GT

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■40	450	22-3046	AFH3-43-50	C0344	FP376.9	TMT-39	TVL-3786	
B	▲40	450							
C	▲20	350							
C2	40	25	22-1156	PRS1470	BR4015	TC48	TD-40-150	TVA-1413	
C3	100	50	22-2580	PRS1360	BR1005	TC3501	TD-100-50	TVA-1310	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	330 10%		1469-00033K	D6-331	22R5T33	CM-20B-331K		MS-333
C5	22 N330 10%	#22-2903				*		10TCS-Q22
C6	2200 10%		DI-2200		PM6D22	CCS-222	JL-222	10TS-D22
C7	150 N750 10%		N750-DI 150	DTN-150	C10T15U	CCTN-151	CN7-315	10TCU-T15
C8	.047 600V		P688N-047	DF-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C9	4700 10%		DI-4700		PM6D47	CCD-472	JL-247	10TS-D47
C10	.015 200V 10%		V84C2S15 10%		PM4S15	4DP-1-153	GEM-4115	4TM-S15
C11	330 10%		1469-00033K	D6-331	22R5T33	CM-20B-331K		MS-333
C12	22 N330 10%	#22-2903				■		10TCS-Q22
C13	2200 10%		BPD-0022		PM6D22	CCS-222	JL-222	10TS-D22
C14	150 N750 10%		N750-DI 150	DTN-150	C10T15U	CCTN-151	CN7-315	10TCU-T15
C15	.047 600V		P688N-047	DF-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C16	4700 10%		DI-4700		PM6D47	CCD-472	JL-247	10TS-D47
C17	.015 200V 10%		V84C2S15 10%		PM4S15	4DP-1-153	GEM-4115	4TM-S15
C18	2.2mfd 3V			UK-225	MP2W2			HY-150
C19	.01 600V		P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S1

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
\# Zenith Part Number.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	3meg *	1/2	63-4451					Loudness, Left Channel
B	3meg *	1/2						Stereo Balance, Right Channel
R2A	5meg	1/2	63-4453				UE2501-5	Bass, Left Channel
B	5meg	1/2					Not Req.	Bass, Right Channel
C	Switch						Not Req.	Stereo-Monaural
R3A	250K	1/2	63-4452	B-51	AD47-250K-Z	Q13-130	▲ UE1371	Treble, Left Channel
B	250K	1/2		SR-51	Not Req.	M13-130		Treble, Right Channel
C	Shaft			Not Req.	KSS-3	Not Req.		

* Tap ⓐ 1meg. ▲ "STA-LOC" Equivalent: FA254A, RU254A, CS3500.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	2.7meg	
R5	330K	
R6	220K	
R7	2700Ω	
R8	27K	
R9	180K	
R10	390K	

ITEM No.	RATING	REMARKS
R11	27K	
R12	220K	
R13	330K	
R14	220K	
R15	2700Ω	
R16	27K	
R17	180K	

ITEM No.	RATING	REMARKS
R18	390K	
R19	240Ω 5% 2W	
R20	27K	
R21	220K	
R22	1000Ω	
R23	5600Ω	
R24	680Ω	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .46A	520VCT ⓐ .070A	5V ⓐ 2A	95-1659	24R13U ①			PC8404 ①	24R13U ①	R-10A ①
	SEC. 3	SEC. 4	SEC. 5							
	6.3VCT ⓐ 1.2A									

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	9000Ω	6-8Ω	95-1658	22S86 ①	A-2900 ①	AU-608 ①	A-3856 ①	22S86 ①	S-15X ①	① Use original frame or drill new mounting hole.
T3	9000Ω	6-8Ω	95-1658	22S86 ①	A-2900 ①	AU-608 ①	A-3856 ①	22S86 ①	S-51X ①	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	QUAM PART No.	
SP1	7½"	PM	6-8Ω	49-877	8A21Z7	① Includes C18.
SP2	3½"	PM	12-14Ω	49-881 ①	3A15T	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ZENITH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1½A 250V		62-17	31201.5 (3AG 1½A 250V)	342001	AGC 1½	HKP

PARTS LIST AND DESCRIPTIONS (Continued)

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							
	ZENITH PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M2	142-92	13TB *	Not Req.	ǂ 66	Not Req.			8TA4-S †* or 8TA4-D ♦ *	

* Includes mounting. ǂ Use Mount PT-3. † Jewel ♦ Diamond

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	ZENITH PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M3	(78RPM)	† W-101STS or ♦ W-101STD	† E98 or ♦ E98D	† Jewel ♦ Diamond
	(LP)	† W-102MGS or ♦ W-102MGD	† E98X or ♦ E98XD	

CABINETS & CABINET PARTS

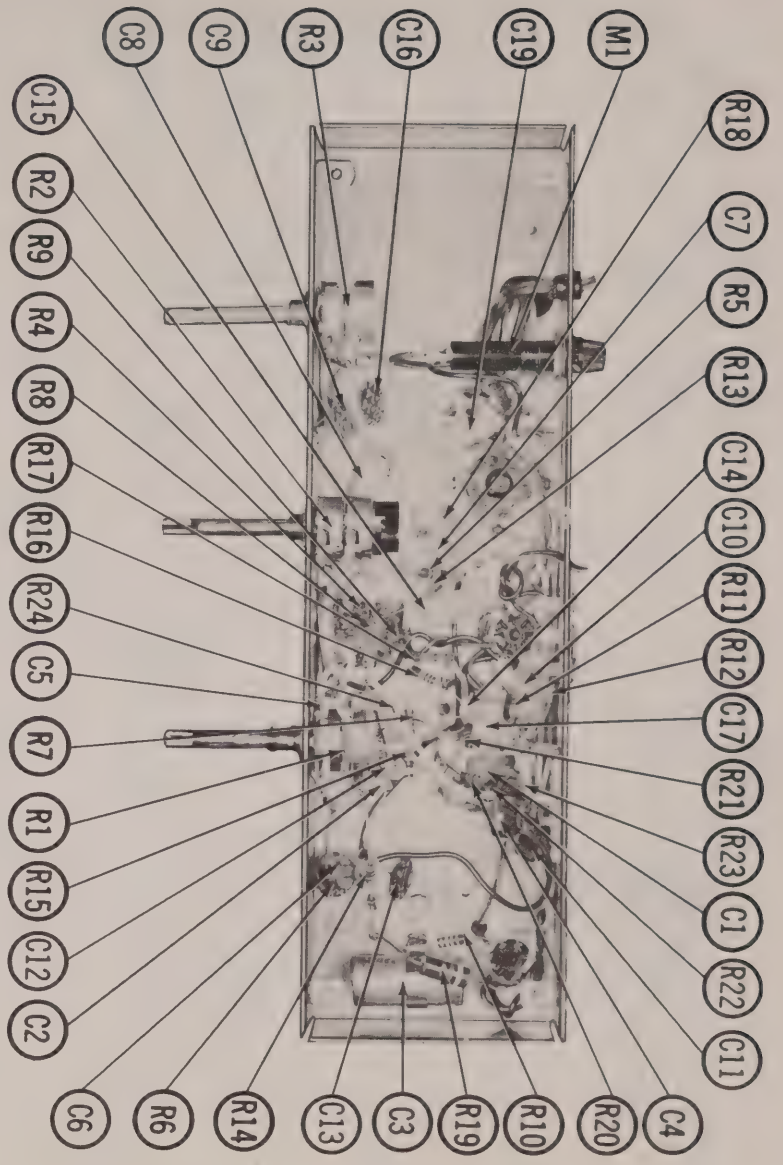
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

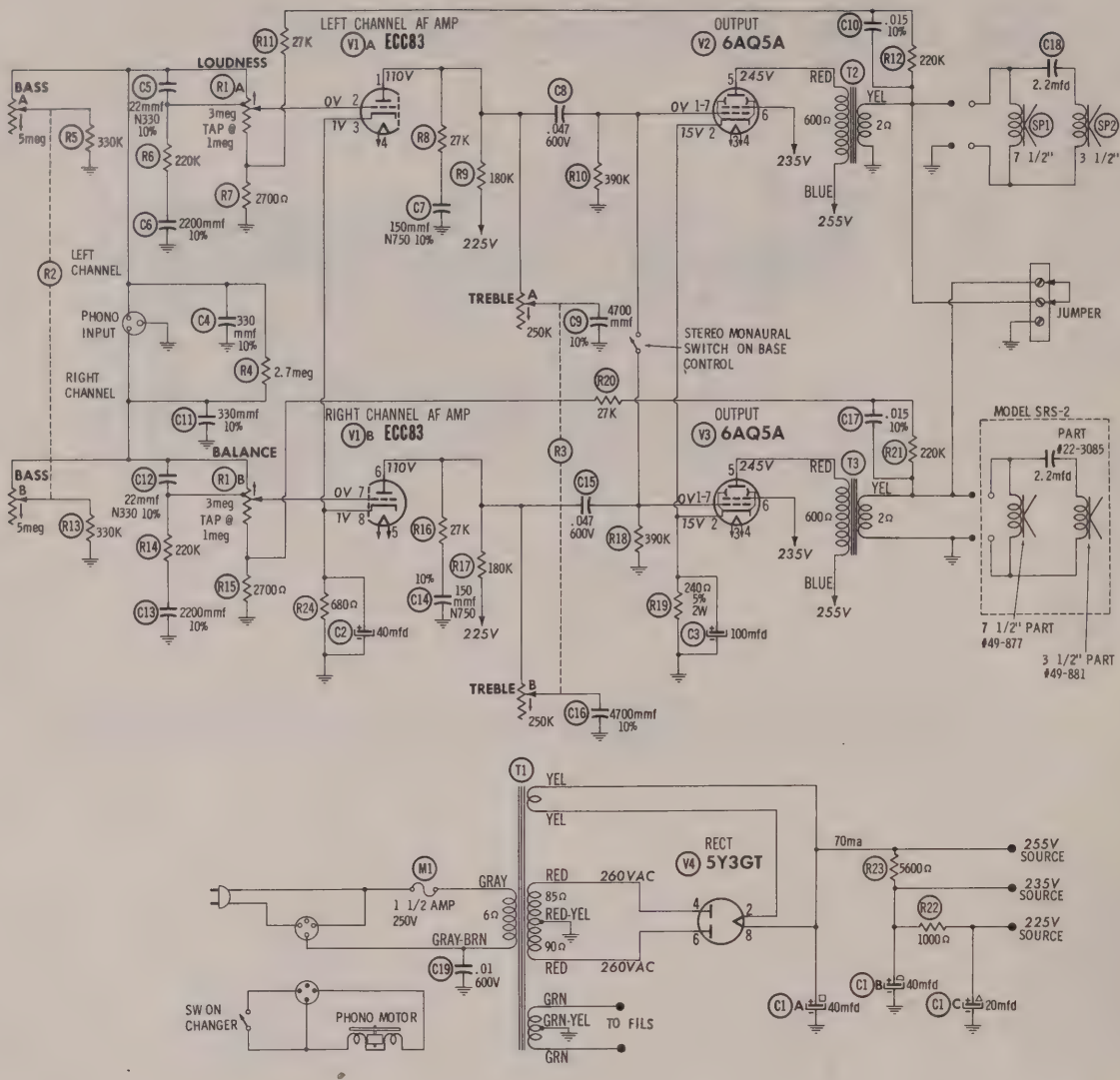
NAME	PART NO.	DESCRIPTION
Knob	46-2113	Volume
Knob	42-2114	Treble, Bass
Cabinet	14-2566E	Model SF112E
Cabinet	14-2566R	Models SF112R
Cabinet	14-2566W	Model SF112W

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	† 185K	2700Ω	680Ω	.2Ω	.2Ω	† 185K	2700Ω	680Ω	.2Ω
V2	6AQ5A	TP	240Ω	.2Ω	.2Ω	† 600Ω	† 5600Ω	300K ▪ 210K		
V3	6AQ5A	TP	240Ω	.2Ω	.2Ω	† 600Ω	† 5600Ω	390K ▪ 210K		
V4	5Y3GT	NC	¶	NC	85Ω	NC	90Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V4.
MEASURED IN MONAURAL POSITION UNLESS DESIGNATED OTHERWISE.
▪ MEASURED IN STEREO POSITION.
NC NO CONNECTION.
TP TIE POINT.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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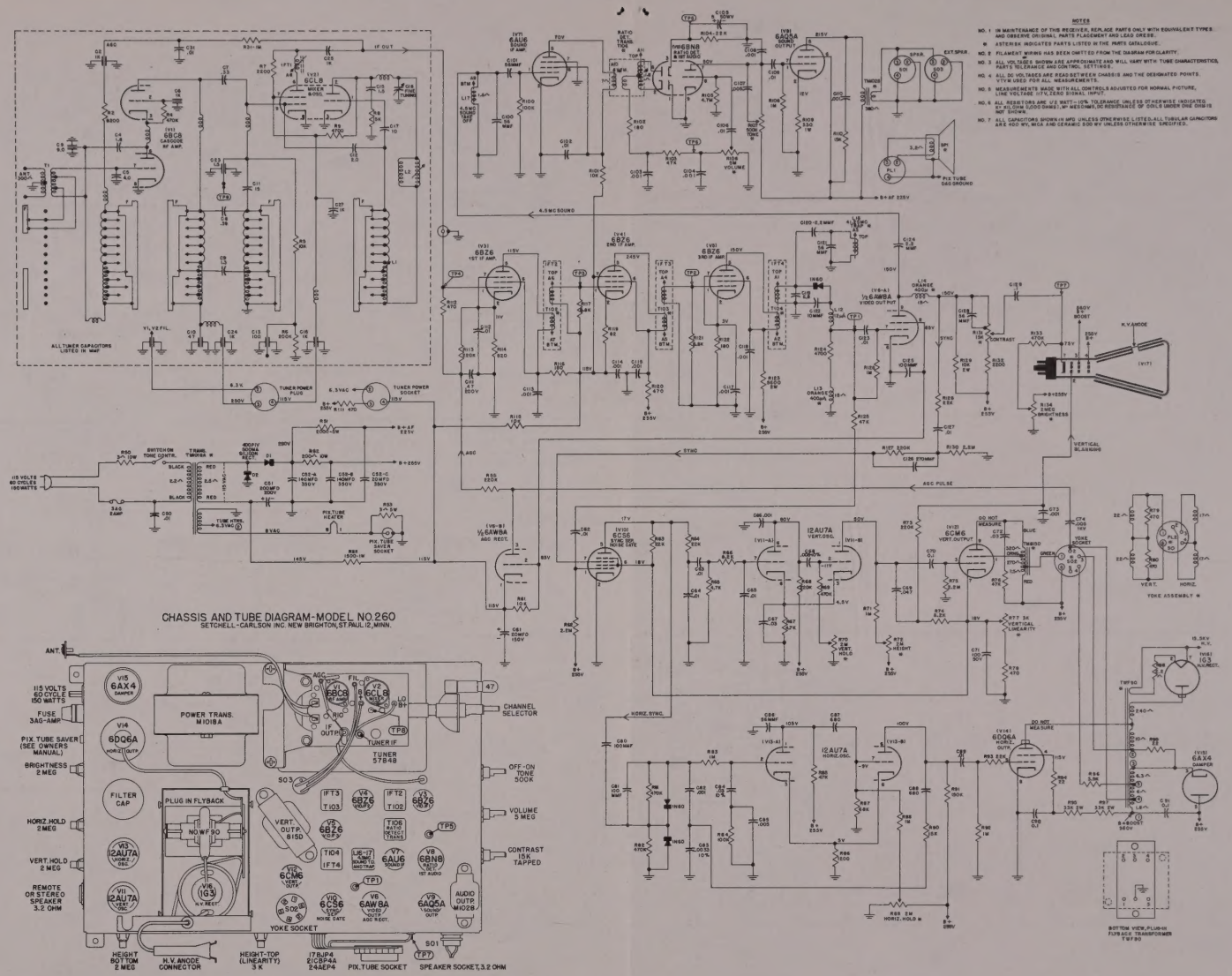
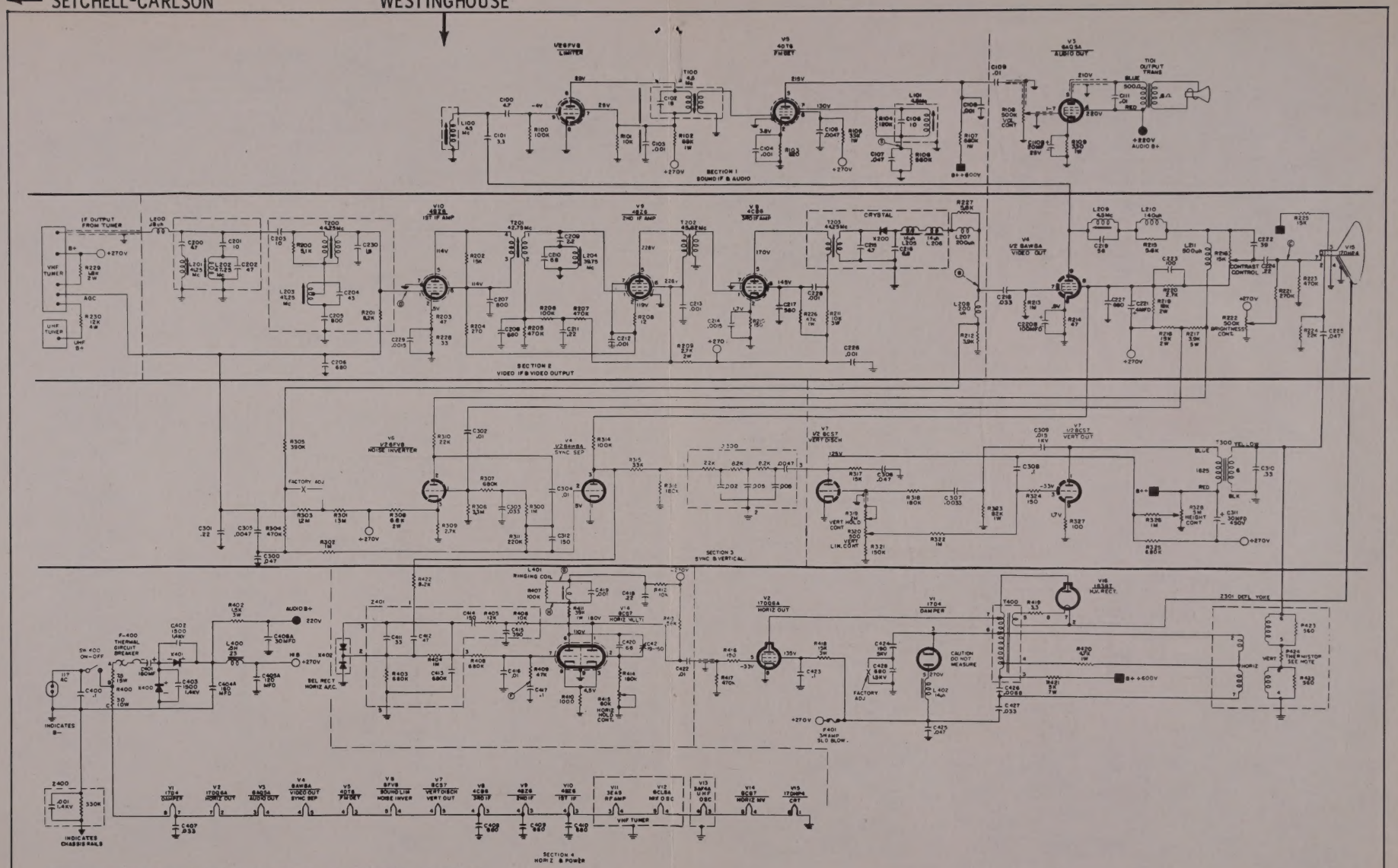
ZENITH MODELS SF112E, R, W, SRS2E, R, W (Ch. 4B25)


NOTES
NO. 1 IN MAINTENANCE OF THIS RECEIVER, REPLACE PARTS ONLY WITH EQUIVALENT TYPES AND OBSERVE ORIGINAL PARTS PLACEMENT AND LEAD DRESS.
* ASTERISK INDICATES PARTS LISTED IN THE PARTS CATALOGUE.
NO. 2 FILAMENT WIRING HAS BEEN OMITTED FROM THE DIAGRAM FOR CLARITY.
NO. 3 ALL VOLTAGES SHOWN ARE APPROXIMATE AND WILL VARY WITH TUBE CHARACTERISTICS, PARTS TOLERANCE AND CONTROL SETTINGS.
NO. 4 ALL DC VOLTAGES ARE READ BETWEEN CHASSIS AND THE DESIGNATED POINTS. VTVM USED FOR ALL MEASUREMENTS.
NO. 5 MEASUREMENTS MADE WITH ALL CONTROLS ADJUSTED FOR NORMAL PICTURE, LINE VOLTAGE 117V, ZERO SIGNAL INPUT.
NO. 6 ALL RESISTORS ARE 1/2 WATT +-10% TOLERANCE UNLESS OTHERWISE INDICATED. K= KILOHM (1,000 OHMS), M= MEGOHM. DC RESISTANCE OF COILS UNDER ONE OHM IS NOT SHOWN.
NO. 7 ALL CAPACITORS SHOWN IN MFD. UNLESS OTHERWISE LISTED. ALL TUBULAR CAPACITORS ARE 600 WV. MICA AND CERAMIC 500 WV UNLESS OTHERWISE SPECIFIED.
ALL TUNER CAPACITORS LISTED IN MMF
TUNER POWER PLUG
TUNER POWER SOCKET
SWITCH ON TONE CONTR.
TRAVEL TIMER
TUBE HTRS.
PIX TUBE HEATER
PIX TUBE SAVER SOCKET
115 VOLTS 60 CYCLES 150 WATTS
3AG 2 AMP
400 P.I.V. SILICON RECT.
AGC RECT.
AGC PULSE
SYNC
VERTICAL BLANKING
HORIZ. SYNC.
DO NOT MEASURE
YOKE ASSEMBLY
SPKR.
EXT. SPKR.
PIX TUBE GRID GROUND
B+ AF 225V
4.5 MC SOUND
B+ 255V
B+ 235V
B+ 225V
B+ 285V
B+ 350V
B+ 550V
B+ 560V
B+ BOOST 560V
H.V. ANODE
(V17)
CONTRAST
BRIGHTNESS 2 MEG
VERT. HOLD
HORIZ. HOLD
VERT. HEIGHT
VERTICAL LINEARITY 3K
HORIZ. OSC.
VERT. OSC.
VERT. OUTPUT
HORIZ. OUTPUT
HORIZ. DAMPER
VERT.
HORIZ.
(V1) 6BC8 CASCODE RF AMP.
(V2) 6CL8 MIXER OSC.
(V3) 6BZ6 1ST IF AMP.
(V4) 6BZ6 2ND IF AMP.
(V5) 6BZ6 3RD IF AMP.
(V6) 6AU6 SOUND IF AMP.
(V7) 6AU6 RATIO DET. & 1ST AUDIO
(V8) 6BN8 VELO. 1ST AUDIO
(V9) 6AQ5A SOUND OUTP.
(V10) 6CS6 SYNC SEP. NOISE GATE
(V11) 12AU7A VERT. OSC.
(V12) 6CM6 VERT. OUTPUT
(V13) 12AU7A HORIZ. OSC.
(V14) 6DQ6A HORIZ. OUTP.
(V15) 6AX4 DAMPER
(V16) 1G3 H.V. RECT.
(V17) PIX TUBE
CHASSIS AND TUBE DIAGRAM-MODEL NO. 260
SETCHELL-CARLSON INC. NEW BRIGHTON, ST. PAUL 12, MINN.
ANT.
115 VOLTS 60 CYCLE 150 WATTS
FUSE 3AG-AMP
PIX TUBE SAVER (SEE OWNERS MANUAL)
BRIGHTNESS 2 MEG
HORIZ. HOLD 2 MEG
VERT. HOLD 2 MEG
REMOTE OR STEREO SPEAKER 3.2 OHM
POWER TRANS. M1018A
PLUG IN FLYBACK
NO. WF 90
FILTER CAP
TUNER 57B48
IF OUTPUT
CHANNEL SELECTOR
OFF-ON TONE 500K
VOLUME 5 MEG
CONTRAST 15K TAPPED
AUDIO OUTP. M1028
YOKE SOCKET
HEIGHT BOTTOM 2 MEG
H.V. ANODE CONNECTOR
HEIGHT-TOP (LINEARITY) 3 K
17BUP4 21CBP4A 24AEP4
PIX TUBE SOCKET
SPEAKER SOCKET, 3.2 OHM

SETCHELL-CARLSON MODELS TL60, 60C, 1760 (CH. 260)

Schematic Diagram Courtesy of Setchell-Carlson Inc.



WESTINGHOUSE MODELS H-P3200, H-P3200U, H-P3300,
H-P3300U, H-P3301, H-P3301U (CH. V-2384-1, -2)

Schematic Diagram Courtesy of Westinghouse Electric Corp.

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